# tyco
## Fuelquip

# VISION

# Installation / Service

# Manual

Issue date : 2 November, 2001

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The instructions contained in this manual have been designed to facilitate the installation, operation and maintenance of this equipment in the safest and most effective manner. Failure to install , commission and operate the equipment in accordance with these  instructions may render the warranty void.

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# Contents

# 1. Introduction

This manual describes the service of the VISION range of pumps and dispensers.

The functions and features of the Vision electronics are dependent on the software version, this manual is written to describe the operation of software version 5.1.

## 1.1 Terminology

The VISION architecture suits pumps in a variety of architectures - singles, duals, mpps.
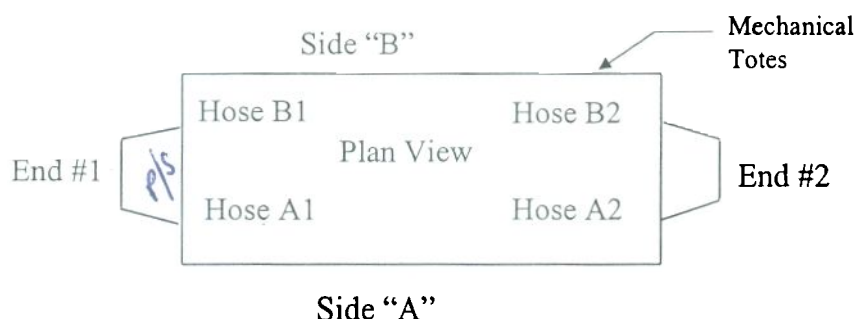


| Sides : | The Side with the Mechanical Totalisers is the "B" Side, this is also the component side of the vision computer module. |
|---|---|
| Products : | The VISION can handle 2 independent products - "product #1" and "product #2" |
| Pump Numbers: | Each side is assigned a number for communications. The VISION can handle 2 different pump numbers. These are referred to as "pump # side A" and "pump # side B". |

## 1.2 Configurations

| Code | Type | Description |
|---|---|---|
| 1P1H | SINGLE | Single product, single Hose |
| 2P2H | DUAL | 2 product 2 hose, set up to be conventionally oriented, i.e. the hoses are located at the ends of the dispenser, and hence may be used by customers located on either side of the dispenser. |
| 1P2HE & IP2HL | DUAL or MPP2 | 1 product 2 hose. Both hoses use the same motor, temperature probe and density. These dispensers may be set-up to be either conventionally oriented or lane oriented (i.e. the hoses may be located at the ends like a conventional dual, or at the sides like an mpp). |
| 2P4H | MPP4 | 2 Products , 4 Hoses 2 products, each with independent motor, density, and temperature. Each product has 2 independent hoses |

# 2. Installation

## 2.1 Location

The installer must be aware of hazardous areas and zones applicable. These are detailed in Australian Standard AS2430.3.
For outdoor locations, the hazardous areas are as below :

1.2m

0.5m

0.5m

8m

Zone 1

Zone 2
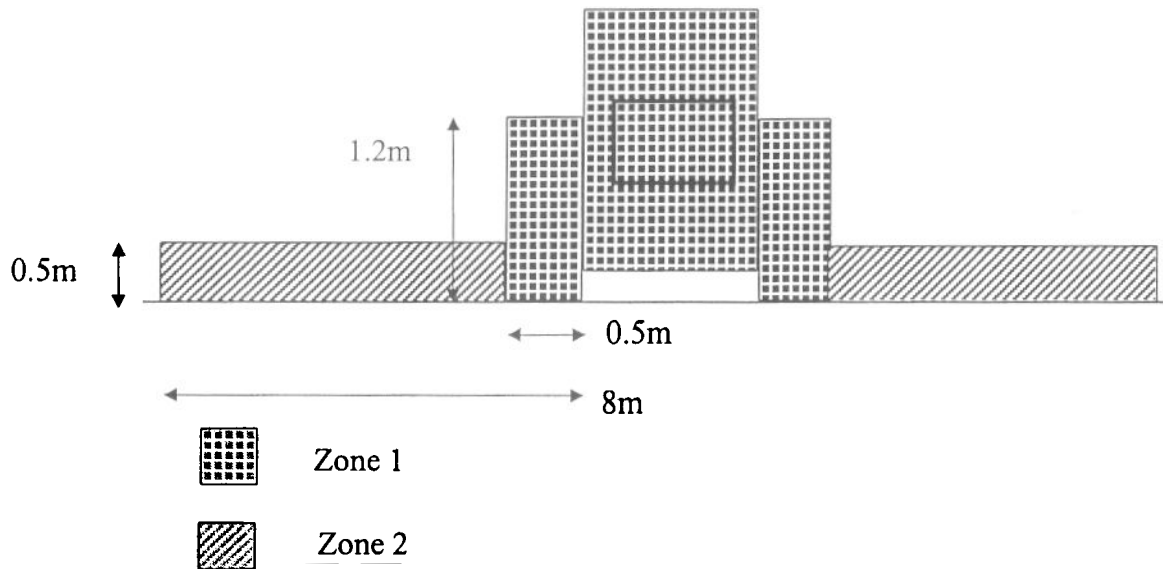
## 2.2 Calibration

Meter adjustment should not be used. Calibration should be done through the manager's keypad.
Refer to the section on calibration functions for details.

## 2.3 Lifting

Ensure the paintwork, piping, cabling, etc. is clear from contact of lifting mechanism. When lifting the dispenser by crane, the harness is secured to the hose mast studs (hose masts removed) in the top of the dispenser

**WARNING**
DO NOT secure any lifting sling beneath the Display POD or the display POD will be damaged.



Secure lifting device to hose mast studs (Hose masts removed).

Do NOT attempt to lift by display pod, or DAMAGE will result.
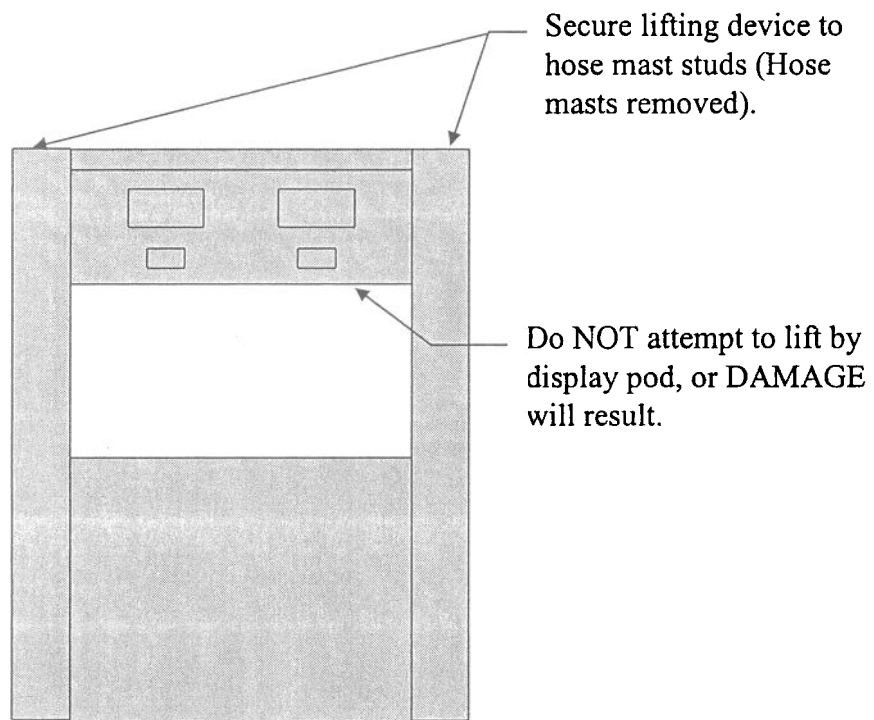
## 2.4  Sub-bases

## 2.5  Riser Locations



VISION RISER & CONDUIT LOCATIONS

VISION 436238
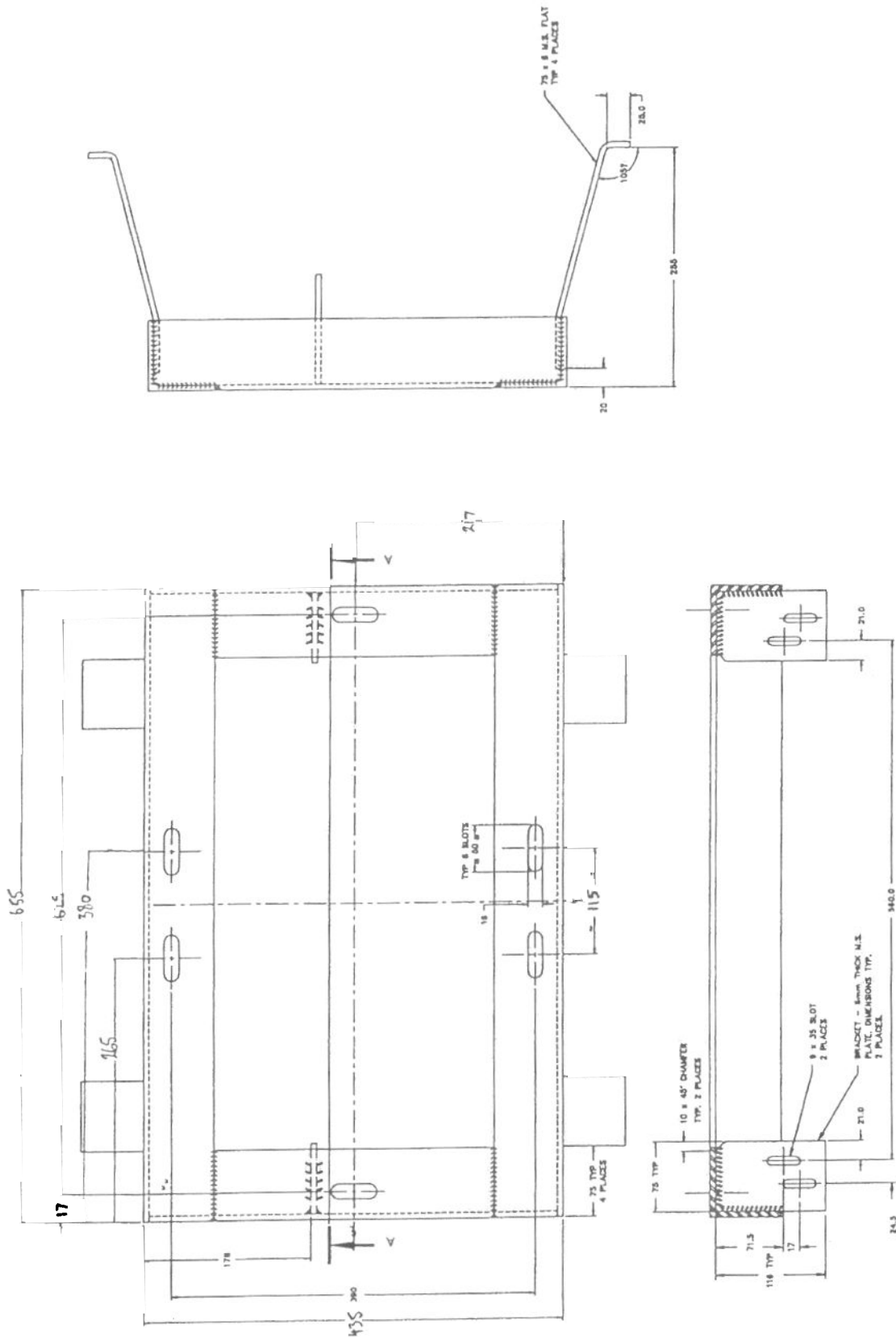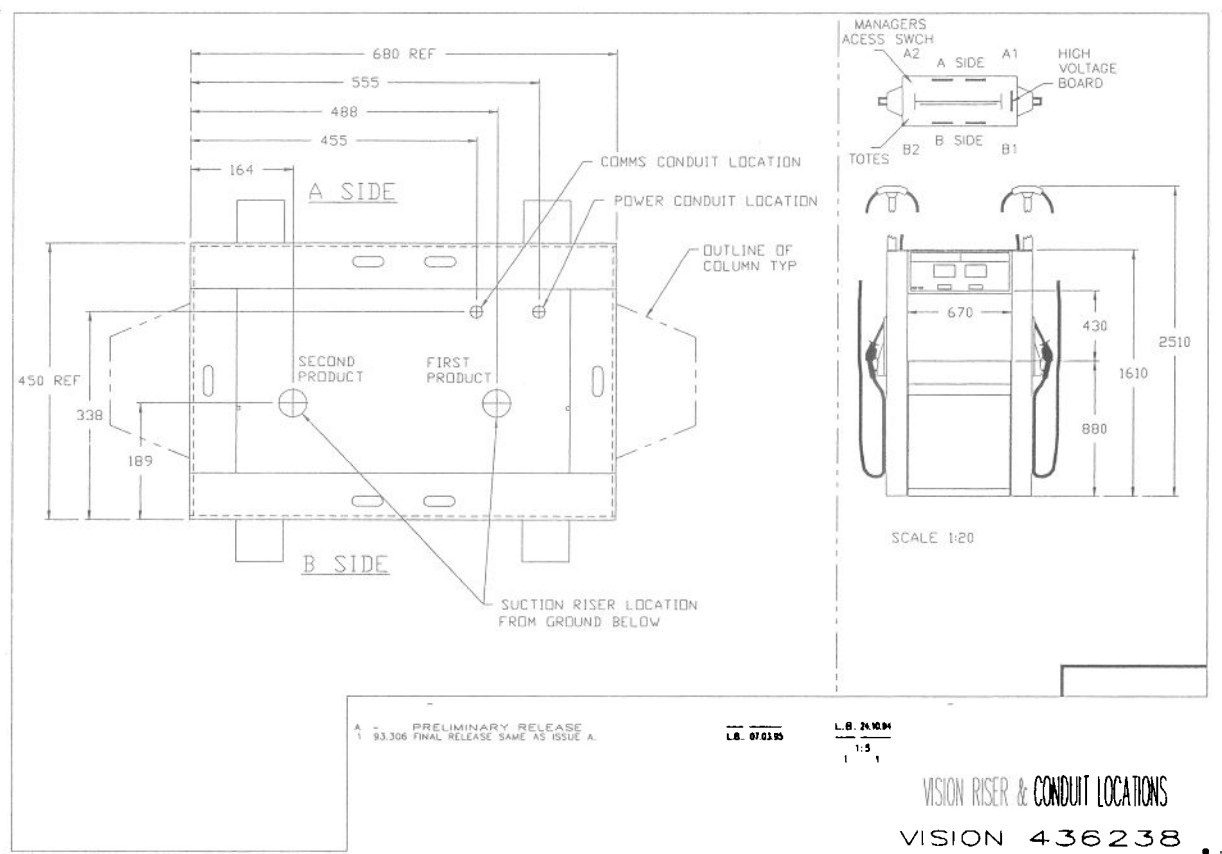
## 2.6 Electrical Installation

### 2.6.1 Mains Termination

The Vision pump must be installed in accordance with local regulations and relevant Australian Standards. In particular:

| | |
|---|---|
| AS 3000 | S.A.A. Wiring Rules. |
| AS 2381 | Selection, Installation and Maintenance of electrical apparatus and associate equipment for use in explosive atmospheres. |
| AS2430 | Classification of Hazardous Areas. |

Conduits must be sealed using approved sealing fittings. (i.e. Y-type stuffing boxes).
Mains is terminated to a flame proof box located within the base of the pump (accessed from "A" side).

### 2.6.2 Communications Wiring - Email Protocol

The cable is run from the base of the pump, up through "End 2" column and into the vapour barrier box via a sealing gland, the cable run should be secured away from 240V wiring.

| Computer Module | Signal |
|---|---|
| J7 pin 1 | data |
| 2 | shield |
| 3 | data |

**Cable:** 2 core data cable with shield.
MM calbles - b2001cs or equivalent is recommended

Note : The data signals on this connector are not polarity sensitive.
Email pump communications - up to 16 pumps (1 dual = 2 pumps) can be connected onto one channel.

### 2.6.3 Communications Wiring - Gilbarco Protocol

The two wire current loop communications cable is run into the termination box in the base of the pump via a sealing gland. Up to 12 pumps (1 dual = 2 pumps) can be connected to one loop.

## NOTE

Gilbarco Current loop communications wiring **is polarity sensitive**, if the polarity is incorrect or the loop is broken at any point, then all pumps will go of line.

| Termination Box | Signal |
|---|---|
| Terminal + | Data - Positive |
| Terminal - | Data - Negative |

**Cable :** 2 core (Shield not required).

# 3. Manager/Service Keypad

## 3.1 Overview

The Preset keypad serves a dual role - it can be used as both as a Preset keypad, and as manager/service function keypad. This is controlled via a "Mode" keyswitch, this is the Key near corner "A2" of the Vapour Barrier Box, and is signified by a red ring.

When in function mode;
  The Preset keypads display :

$$F U N C$$

On the Main display the last transaction details are replaced by dashes, providing all transactions have been completed. i.e. when pump is idle.

```
 -  -  -  -    -
 -  -  -  -    -
```
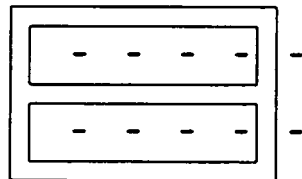
Any of the function keypads may be used for manager/service functions, i.e. When in function mode keypads are not hose specific.

Non preset pumps have only 1 keypad, located above the mechanical totes. The buttons are indicated by four black dots and the preset display is hidden.

The keys on the Preset keypad are as follows :

| Normal mode: | $5 | $10 | $20 | CLR |
|---|---|---|---|---|
| Function mode: | TEST | MANAGER or Shift Digit | DOWN | UP |
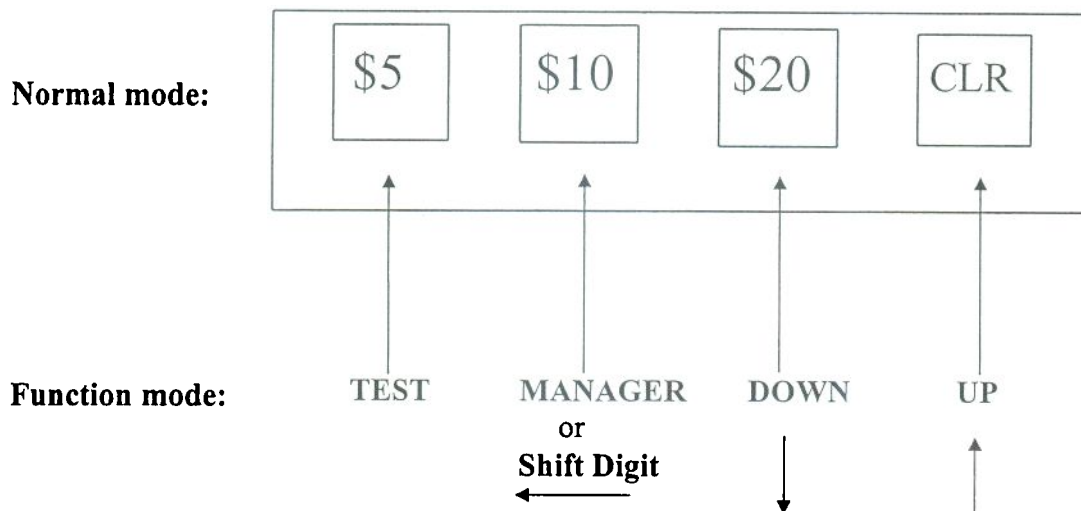
The **CALIBRATE** key is on the computer board, and is protected by a W&M seal.

Manager/Service Functions cannot be accessed unless all transactions are idle. When in function mode, if the TEST, MANAGER or CALIBRATE keys are pushed while there is a transaction in progress, the display will warn :

```
 _____
|    _   _   _    |
|   |\| | | |     |
|   | | |_| |     |
|_____|
|    _   _   _    |
|   | | | | |_    |
|   |_| |_| |_    |
|_____|
```

NOT
IDLE
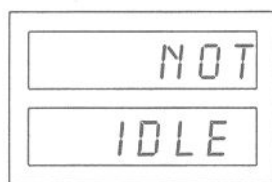
Operation of the keypad follows the same pattern for all functions:

- Press MANAGER, TEST or CAL to select the desired set of functions.

- If the value/parameter displayed is to be altered, use the UP or DOWN keys to alter the value, or to cycle through the available options.

- When a value/parameter shown on the display applies to one of the hoses (e.g. K-factor, CPL), lift the appropriate hose to indicate which of the meters is being selected.

- Values with more than 2 digits (e.g. K-Factor, CPL) use the "Shift Digit" key to select the digit to be altered, the current digit selected is indicated as a number (1 to 5) in the special segments digit (small digit - centre right of main LCD panel).

- When finished with each parameter, press the MANAGER, TEST or CAL key to go on to the next parameter.

## 3.2 Manager Functions

Pressing the Manager's key selects the following functions:
- Read totals
- Switch lights ON/OFF
- Exit Manager functions

### 3.2.1 Read Totals

This function displays cumulative meter totals.

Independent volume and amount (dollar) totals are kept for each meter. These totals may be 5 or 10 digits in length.

For the 5 Digit format, Dollars are displayed on the top row of the main display and Litres on the second row. For 4 Hose models the UP/DOWN keys are used to select between product 1 or product 2 totals, the Cents Per Litre displays indicate the current product, i.e. the CPL display for the product NOT selected, will be blanked.

For the 10 Digit format, the Total is displayed across the top 2 rows of the main display, the UP/DOWN keys used to select between Dollars and Litres, and also between product 1, or product 2. The Cents Per Litre displays indicate the current product and if dollars or litres are being displayed.

If the vision computer detects an error when reading totals from non volatile memory, the main displays special segments will show "Totals Error"

### 3.2.2 Lights ON/OFF

This function switches the fluorescent Lights on/off.

Use UP/DOWN keys to switch lights on/off. The lights may also be controlled remotely, providing the console has this facility.

**NOTE:**
The Console has priority, and will override the Manger function!

## 3.3 Test Functions

The Test Functions give access to:

- The Vision self tests and diagnostics
- Some set-up functions, where Weights and Measures security are not required (e.g. prices, pump numbers etc.).
- Access to view (but not change) parameters set up by Calibrate functions (e.g. K-factors)

Pressing the TEST key selects the following functions:
- Set Price
- Set communications mode
- Set Pump Numbers
- Display communications protocol type
- Display Status
- Display LCD tests
- Display K-Factors
- Display Model Type
- Display Type Pump/Dispenser
- Display Products
- Display Totals format
- Display Mechanical Totals format
- Display Preset type
- Display Preset Dollar Key Value
- Display Preset Litre Key Value
- Display Preset Number of Active Digits
- Display Software version
- Exit Test functions

### 3.3.1 Set Fuel Price

Upon selecting this function, the current fuel price for each hose is displayed (in cents/Litre), together with the "Set Price" prompt.

1. Select the meter whose price is to be set (lift appropriate hose).
2. Use the SHIFT DIGIT key to select the digit to be altered.
3. Use the UP and DOWN keys to alter the price.

```
   5 E T

  P R I C E

    6 9 . 9
```

### 3.3.2 Set Communications Mode

Use the UP and DOWN keys to alter mode. Stand Alone = Not communicating.  On Line = Communicating, see Owners manual for explanations.

**Note :**

The communications mode is only read on power up - to change the mode, exit TEST functions and press the "RESET" button on the vision computer board (upper right hand side), or power down for more than 10 seconds.

```
   5 T A N D        O N

  A L O N E        L I N E
```
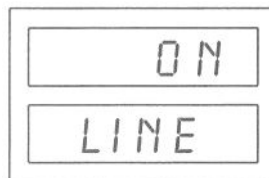
### 3.3.3 Set Pump Numbers

Select the side whose Pump Number is to be altered (lift appropriate hose).

Use the UP and DOWN keys to alter the pump number.

```
  P   N O

       1 4
```
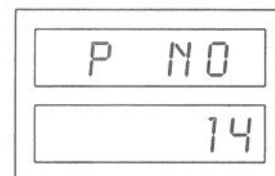
Pump numbers are in decimal:
- Email comms 0 - 15 (0 = pump number 16).
- Gilbarco comms 1 - 12

### 3.3.4  Display communications protocol type

Displays the protocol currently selected.

```
┌─────────────┐
│   G I L B   │
├─────────────┤
│    ∏ P P    │
└─────────────┘
```

### 3.3.5  Display Status

This function allows the user to observe the current communications status, the current communications mode, and the hose switch status.
The display contains a number of different fields, as shown in the following diagram:

Comms message counter (first 2 digits)        Channel Indicator        Comms Error Counter (Last 2 digits)

```
┌─────────────┐
│  2 C A 7 3  │
├─────────────┤
│  H - -    C │
└─────────────┘
```

Hose Status Indicator          Current communications Mode
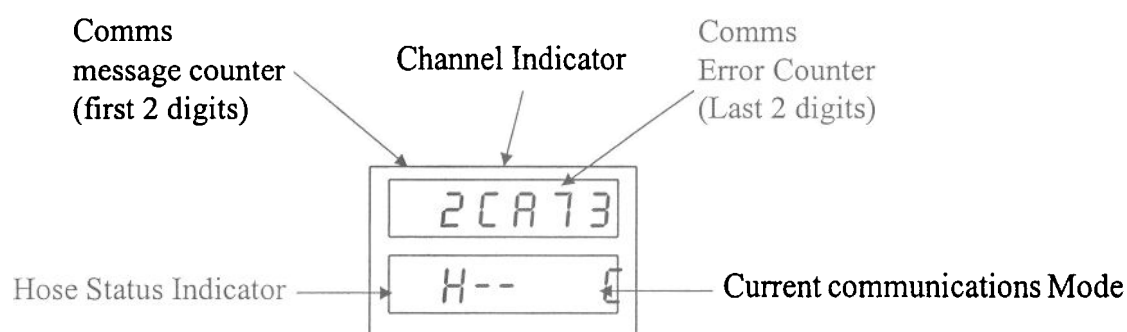
| Field | Meaning |
|---|---|
| Message received counter | Counts messages from the controller. Typically 1-5 messages per second , depending on the controller type. Counts in hexadecimal |
| Channel Indicator | Indicates which pump this display refers to - "A" = Pump A, "B" = Pump B. |
| Error Counter | Counts communications errors. Should be very low - one error per minute Counts in hexadecimal  NOTE: If communications have not been enabled, the top row will display - "C OFF" |
| Hose status | The hose indicator shows a "-" if the hose switch is inactive, and a "1" if Hose switch 1 is active or a "2" if hose switch 2 is active. This facilitates adjustment of the hose switch. |
| Communications Mode | This field shows the current comms mode setting, "C" = Communicating, "SA" = Stand Alone. |

### 3.3.6 Display LCD Tests

The LCD test allows the user to test all of the segments in the LCD displays. On entry to the LCD test, the LCD display shows all eight's.

Using the *up/down* keys, the LCD test mode can be toggled between :
- display all eight's
- display blanks
- display all special segments
- perform a walking segment test

```
┌──────────────┐
│ 1 8 8 8 8 8  │
│   8 8 8 8 8  │
└──────────────┘
```
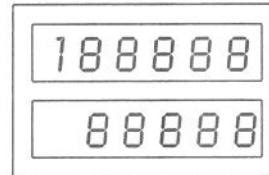
### 3.3.7 Display K-factors

Display the current K-factor set for each meter.

Note : the K-factor may only be altered via the calibrate functions.
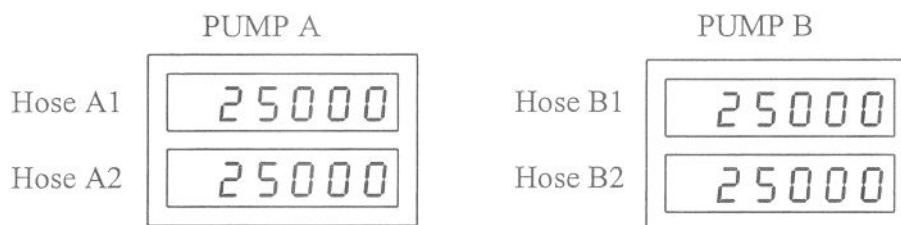
PUMP A                          PUMP B

Hose A1  `2 5 0 0 0`    Hose B1  `2 5 0 0 0`

Hose A2  `2 5 0 0 0`    Hose B2  `2 5 0 0 0`

The K-factor is displayed without decimal points, and will be typically around 25000 - which represents 2.5mL/pulse.

### 3.3.8 Display Model Type

Displays the current Model Type set-up.

Second row of the main display indicates number of products and hoses.

Note : Model Type may only be altered via the calibrate functions.

```
┌──────────────┐
│  T Y P E     │
│  1 P 2 H L   │
└──────────────┘
```

### 3.3.9 Display Type, Pump/Dispenser

Displays whether the Vision is configured to be a Pump or a Dispenser.

```
┌──────────────┐        ┌──────────────┐
│ ┌──────────┐ │        │ ┌──────────┐ │
│ │  T Y P E │ │        │ │  T Y P E │ │
│ └──────────┘ │        │ └──────────┘ │
│ ┌──────────┐ │        │ ┌──────────┐ │
│ │  P U M P │ │        │ │  D I S P │ │
│ └──────────┘ │        │ └──────────┘ │
└──────────────┘        └──────────────┘
```
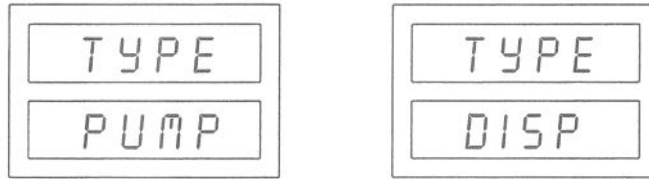
### 3.3.10 Display Products

Displays the current setting for Product 1 on display "A" and Product 2 on display "B".

Products types:
Petrol, Diesel or LPG.

Note :
Product type may only be altered via
the calibrate functions.

```
┌──────────────┐
│ ┌──────────┐ │
│ │ P R O D 1│ │
│ └──────────┘ │
│ ┌──────────┐ │
│ │ P E T R L│ │
│ └──────────┘ │
└──────────────┘
```

### 3.3.11 Display Electronic Totals Format

Display's the current set-up of the Electronic Totals. See calibrate function for details.

| TOTALS | |
|--------|--------|
| **5 Digit** | Dollars on Top Row, Litres on Second Row. |
| **10 Digit** | Displays 10 digits wrapped around 2 rows. |

```
┌──────────────┐
│   T O T L S  │
│   5    D I G │
│  ┌────────┐  │
│  └────────┘  │
└──────────────┘
```
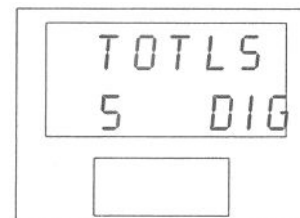
### 3.3.12 Display Mechanical Totals Format

Display's the current set-up of the 2 Mechanical tote ports, see Calibrate function for details.
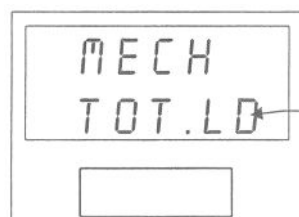
```
┌──────────────┐
│   M E C H    │
│   T O T . L D│──── "L d" indicates Tote 1 is Litres
│  ┌────────┐  │      and Tote 2 is Dollars
│  └────────┘  │
└──────────────┘
```

### 3.3.13 Display Preset Type

Displays keypad configuration, see Calibrate function for details.

| PRESET TYPE | |
|---|---|
| t  dis | Disabled (default) |
| t  doL | Dollars |
| t  Lit | Litres |
| t  d-L | Dollars & Litres |

```
 PRSET
 T  D-L
```
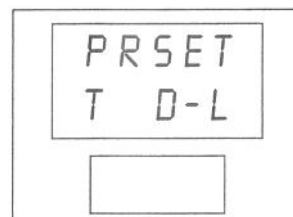
### 3.3.14 Display Preset Dollar Amount

Displays dollar key value, see Calibrate function for details.

| PRESET DOLLAR AMOUNT | |
|---|---|
| d  1 | 1, 5, 10  (Preset Key Value) |
| d  5 | 5, 10, 20 |
| d  10 | 10, 50, 100 |

```
 PRSET
 D  1
```
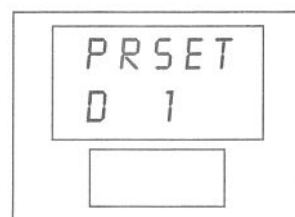
### 3.3.15 Display Preset Litre Amount

Displays litre key value, see Calibrate function for details.

| PRESET LITRE AMOUNT | |
|---|---|
| L  1 | 1, 5, 10  (Preset Key Value) |
| L  5 | 5, 10, 20 |
| L  10 | 10, 50, 100 |

```
 PRSET
 L  1
```
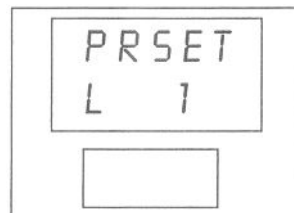
### 3.3.16 Display Preset Active Digits

Displays number of active digits for dollars keypads, see Calibrate function for details.

| PRESET ACTIVE DIGITS | |
|---|---|
| 2 Acti | 2 Active Digits - 9900 |
| 3 Acti | 3 Active Digits - 9990 |

```
 PRSET
 2  ACTI
```
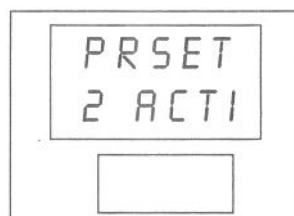
### 3.3.17 Display Software version

Displays the current software version across the top 2 lines of the main display. In the following example, Model type is High Flow, and the Software Revision is **5.1**.

```
        ┌─────────────────┐
        │  ┌───────────┐   │
        │  │  H F .    │   │
        │  │      5 . 1│   │
        │  └───────────┘   │
        │  ┌─────────┐     │
        │  │ S O F T │     │
        │  └─────────┘     │
        └─────────────────┘
```
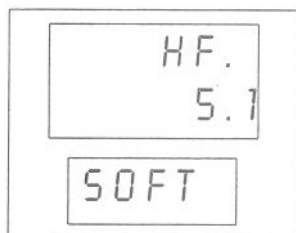
## *3.4 Calibration Functions*

| Warning |
|---|
| For instruments used in trade, the CALIBRATE button is accessed by breaking a Weights and Measures Seal, and may only be done by persons authorised under Trade Measurement Legislation. It is an offence to tamper with the calibration or any sealing device. |

After installation, and prior to use, the VISION computer module must be configured, and the meter system calibrated.

To return all calibration parameters to their default settings, use the **"Initialisation"** sequence described later in this manual.

### 3.4.1 Accessing Calibrate functions

The CALIBRATE button is located on the vision computer board (upper left hand side) behind a sealing cover.

Remove sealing cover to access Calibrate key.

Pressing the Calibrate button accesses the following functions:

- Set K-Factor
- Auto K-Factor
- Set Model Type
- Set Type Pump / Dispenser
- Set communications protocol type
- Set Products
- Set Totals format
- Set Mechanical Totals format
- Set Preset Type
- Set Preset Dollar Key Amount
- Set Preset Litre Key Amount
- Set Preset Number of Active Digits
- Exit Calibrate functions

### 3.4.2  Set K-Factor

Alters the K-factor set for each meter.
The K-factor is displayed without decimal points, and will be typically around 25000 - which represents 2.5mL/pulse.

- Select the hose whose K-Factor is to be altered (lift appropriate hose).
- Use the SHIFT DIGIT key to select the digit to be altered.
- Use the UP/DOWN keys to alter K-Factor.

| PUMP A | | PUMP B | |
|---|---|---|---|
| Hose A1 | $25000$ | Hose B1 | $25000$ |
| Hose A2 | $25000$ | Hose B2 | $25000$ |
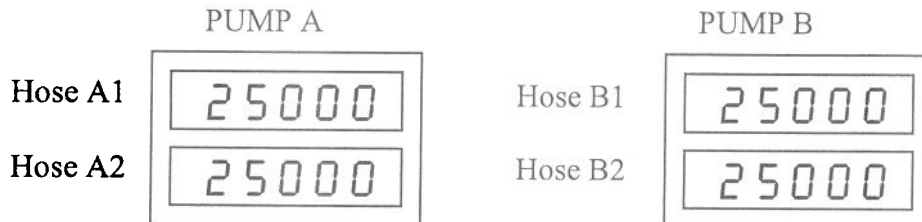
### 3.4.3  Auto K-factor

This function enables/disables automatic calibration.

To enter Auto Calibration mode,
use the UP/DOWN keys to set Auto K to ON.

```
AUTO
  ON
```
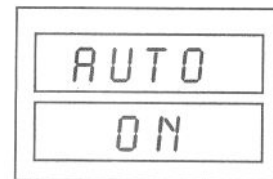
Exit Calibrate functions and the displays will show:

```
 CAN
   0
AUTO
```
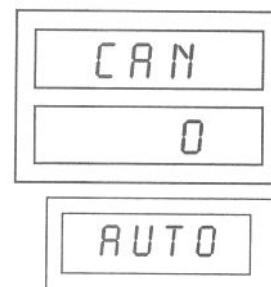
To calibrate each meter, accurately fill a calibrated measuring can from each hose in turn, if the transaction is within 10 % of a *standard can size* a new K-Factor will be calculated and the can size will be displayed on completion of the transaction.

If the transaction is NOT within 10 % of a *standard can size* the K-Factor will NOT be altered, and the failed transaction is indicated by a can size of ".0" (as shown above).

*Standard Can sizes:*
- 10.0 Litres
- 15.0 Litres
- 20.0 Litres
- 200.0 Litres

When all hoses have been calibrated, enter Calibration functions again and set Auto K to OFF. Test transactions can now be run to verify calibration.

### 3.4.4 Set Model Type

This function allows the VISION model type to be set up.

Press the Up/DOWN keys to toggle between the options :
- 1P1h     1 product, 1 hose.
- 1P2hL     1 product, 2 hose, lane orientation.
- 1P2hE     1 product, 2 hose, end orientation.
- 2P2h     2 product, 2 hose, (end orientation).
- 2P4h     2 product, 4 hose, (MPP style, lane orientation).

```
TYPE

1P2HL
```

### 3.4.5 Set Type Pump/Dispenser

Use this function to configure the Vision as a *PUMP* or a *DISPENSER*
Note that Diesel Air Detection is disabled when Dispenser is selected.

```
TYPE            TYPE

PUMP            DISP
```
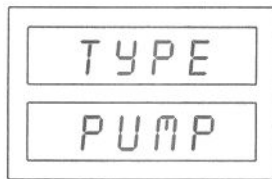
### 3.4.6 Set communications protocol type

This functions is used to set the Pump/Console communications type.

<u>For Gilbarco:</u>
Electroline is the older format i.e. no cumulative totals.
For new format Electroline, set to Gilbarco MPP.
Highline protocol is NOT supported.

Press the UP/DOWN keys to select.
- Email
- Gilbarco Electroline
- Gilbarco MPP

```
GILB

MPP
```

**NOTE:** A change of comms type will not take effect until the next power up.

### 3.4.7 Set Products

Use this function to set the product type
Product 1 is shown on display "A".
Product 2 on display "B".

Products types are:
Petrol, Diesel or LPG.(Do NOT use LPG).

```
PROD1

PETRL
```

**Note :** To enable Diesel Air Detection, DIESEL must be selected and the Vision Type set to PUMP.

### 3.4.8  Set Electronic Totals Format

Use UP/DOWN Keys to select:

| TOTALS | |
|---|---|
| **5 Digit** | Dollars on Top Row, Litres on Second Row. |
| **10 Digit** | Displays 10 digits wrapped around 2 rows. |

```
TOTLS
 5  DIG
```
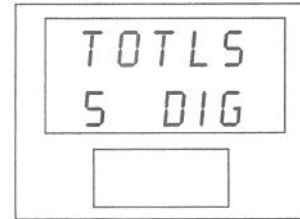
### 3.4.9  Set Mechanical Totals Format

Use UP/DOWN Keys to select the set-up of the 2 Mechanical tote ports as follows:

| MECHANICAL TOTALS FORMAT | |
|---|---|
| **Option** | **Meaning** |
| L - | Tote 1 = Sum of Litres for all hoses. |
| D - | Tote 1 = Sum of Dollars for all hoses. |
| L L | Tote 1 = Litres hose 1.  Tote 2 = Litres hose 2. |
| D D | Tote 1 = Dollars hose 1.  Tote 2 = Dollars hose 2. |
| L D | Tote 1 = Litres for all hoses.  Tote 2 = Dollars for all hoses. |
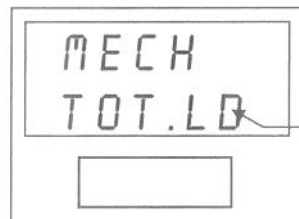
```
MECH
TOT.LD
```
"L d" indicates Tote 1 is Litres and Tote 2 is Dollars

### 3.4.10  Set Preset Type

Use UP/DOWN Keys to select:

| PRESET TYPE | |
|---|---|
| t  dis | Disabled (default) |
| t  doL | Dollars |
| t  Lit | Litres |
| t  d-L | Dollars & Litres |

```
PRSET
T  D-L
```
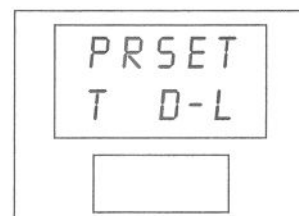
### NOTES:

When configured for both Dollars and Litres, the second keypad on each side will be the Litres Keypad.

### 3.4.11 Set Preset Dollar Amount

Use UP/DOWN Keys to set the value of the Dollar Preset Keys:

| PRESET DOLLAR AMOUNT | |
|---|---|
| d 1 | 1, 5, 10 (Preset Key Value) |
| d 5 | 5, 10, 20 |
| d 10 | 10, 50, 100 |

```
 PRSET
 D  1
```
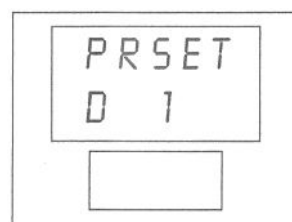
### 3.4.12 Display Preset Litre Amount

Use UP/DOWN Keys to set the value of the Litre Preset Keys:

| PRESET LITRE AMOUNT | |
|---|---|
| L 1 | 1, 5, 10 (Preset Key Value) |
| L 5 | 5, 10, 20 |
| L 10 | 10, 50, 100 |

```
 PRSET
 L   1
```
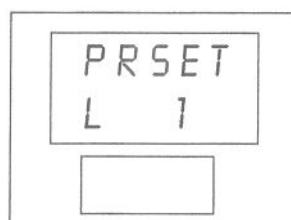
### 3.4.13 Display Preset Active Digits

Use UP/DOWN Keys to set the number of active digits:

| PRESET ACTIVE DIGITS | |
|---|---|
| 2 Acti | 2 Active Digits - 9900 |
| 3 Acti | 3 Active Digits - 9990 |

```
 PRSET
 2 ACTI
```
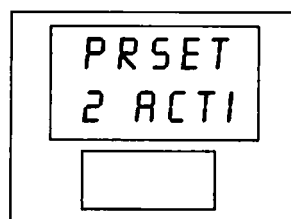
## NOTES:

This is for Dollars Keypads, selects how many digits are incremented by the keypad, this is the left 2, or 3 digits, of the 4 digit display.

**Option "3 Active",** shifts the preset display decimal point right one place, therefore an extra "0" may have to be painted on the preset, for some Unit Price Options.

## 4. Service - Electrical

### 4.1 Vapour Barrier Box

The vapour barrier box houses most of the electronics, including:
- Computer board
- High voltage board
- LCD display boards
- Preset keypads

Access into the Vapour Box is via the 2 LCD panels (doors). Undo the keylocks (2 each side of V B Box) and the doors pull out from the bottom, then hangs from the hinges.

### 4.2 Pump Wiring

### 4.2.1 Hose switch and Vapour sensor connections

<u>Hose Switch 1</u>

| Connector J5 Hose Switch 1 | Pin | 1P1H 1P2HE & 2P2H | 1P2HL | 2P4H |
|---|---|---|---|---|
| | | | | |
| | 6 | Boot 1 | Boot A1 | Boot A1 |
| | 5 | Boot 1 common | Boot A1 common | Boot A1 common |
| | 4 | | Boot B1 | Boot B1 |
| | 3 | | Boot B1 common | Boot B1 common |
| | 2 | Air Detector 1 n.o. contact | Air Detector 1 n.o. contact | Air Detector 2 n.o. contact |
| | 1 | Air Detector 1 common | Air Detector 1 common | Air Detector 2 common |

<u>Hose Switch 2</u>

| Connector J6 Hose Switch 2 | Pin | 1P2HE | 2P2H | 2P4H |
|---|---|---|---|---|
| | | | | |
| | 6 | Boot 2 | Boot 2 | Boot A2 |
| | 5 | Boot 2 common | Boot 2 common | Boot A2 common |
| | 4 | | | Boot B2 |
| | 3 | | | Boot B2 common |
| | 2 | | Air Detector 2 n.o. contact | No connection |
| | 1 | | Air Detector 2 common | No connection |

### <u>NOTE:</u>
For 2P4H with Diesel, the Diesel Hydraulics is always Product 2, and the Air detector connects to J5 Hose switch 1.

### 4.2.2 Pulser connections

#### WIRING ORDER

Note that the order of "A" and "B" signals depends on the meter type

| Connector | Colour | Signal |
|-----------|--------|--------|
| Pin 1 | Shield | (no connect) |
| Pin 2 | Green | 0 v |
| Pin 3 | Blue | Pulse B |
| Pin 4 | Yellow | Pulse A |
| Pin 5 | Red | +5 v |

#### CONNECTOR ORDER

| Connector | 1P1H | 1P2HL | 2P2H & 1P2HE | 2P4H |
|-----------|------|-------|--------------|------|
| J 8 | End 1 (A1) | A1 | End 1 (A1) | A1 |
| J 9 | | B1 | End 2 (B1) | B1 |
| J 10 | | | | A2 |
| J 11 | | | | B1 |

### 4.2.3 Solenoid Valve connections

| Valve | 1P1H | 1P2HE | 1P2HL | 2P2H | 2P4H |
|-------|------|-------|-------|------|------|
| A1  (conn J2) | End 1 | End 1 | A1 | End 1 | A1 |
| A2  (conn J2) | | | | End 2 | A2 |
| B1  (conn J3) | | End 2 | B1 | | B1 |
| B2  (conn J3) | | | | | B2 |

When wiring to the High Voltage board, observe and follow the markings on the PCB itself.

### WARNING
The wiring on connector J2 (side A Valves) is the reverse of the wiring on J3 (side B valves).

### 4.2.4 Gilbarco / PEC isolator connections

| Comms Isolator board connections | |
|----------------------------------|--------------------|
| J1 | vision computer J12 |
| J2 Pin 1 | Gilbarco Negative wire |
| J2 Pin 2 | No connect |
| J2 Pin 3 | Gilbarco Positive wire |
| J3 Pin 1 | PEC Black wire |
| J3 Pin 2 | No connect |
| J3 Pin 3 | PEC Red wire |

PEC comms NOT implemented

## 4.3 Service - Vision Computer Module

### 4.3.1 Coldboot / Warmboot

A power up when the displays are still showing the previous delivery information is called a "warm-boot". The displays continue to show the last delivery information for at least 30 minutes after power is removed. When the vision computer powers up, the warm boot power up message is displayed :

```
┌─────────────────┐
│ ┌─────────────┐ │
│ │             │ │
│ └─────────────┘ │
│ ┌─────────────┐ │
│ │   START     │ │
│ └─────────────┘ │
└─────────────────┘
```
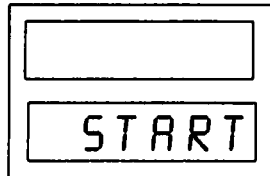
A power up may be simulated by pressing the "RESET" button, located on the upper right hand side of the vision computer module.

A power up when the displays are blank is called a "COLD-BOOT".

A COLD-BOOT may be forced by a power up or reset with the mode switch in the on position. A cold-boot ensures that all internal memory is reset to a known state. When a Coldboot is performed, the displays show the confirmation message for a few seconds.

```
┌─────────────────┐
│ ┌─────────────┐ │
│ │   COLD      │ │
│ └─────────────┘ │
│ ┌─────────────┐ │
│ │   BOOT      │ │
│ └─────────────┘ │
└─────────────────┘
```
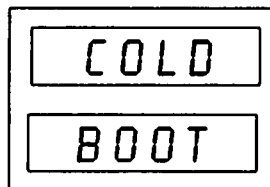
**NOTE :**
A Coldboot should always be performed after a change of software version. On some occasions, an **INITIALISATION** may be necessary. Refer to the upgrade instructions with the software.

### 4.3.2 Initialisation

<u>**Important**</u>

The initialisation sequence erases all internal parameters, including all calibration factors, set-up and totals. Before performing an initialisation, check that all necessary information has been recorded.

The VISION computer module may be re-initialised to default conditions by a power up or reset with the Calibrate button depressed, the Calibrate button must be kept depressed until the INIT message is displayed, when the initialisation is complete the VISION displays "INIT DONE" (release Calibrate Button at this point) the vision then displays "START", and reverts to normal operation mode.

```
┌─────────────────┐
│ ┌─────────────┐ │
│ │   INIT      │ │
│ └─────────────┘ │
│ ┌─────────────┐ │
│ │   DONE      │ │
│ └─────────────┘ │
└─────────────────┘
```
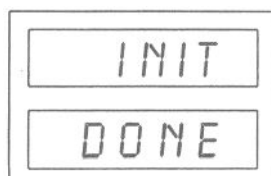
### 4.3.3 Power Supply voltage

The Vision computer module requires an input power supply voltage of 22 volts AC from the high voltage board - the computer will not start until the input voltage is greater than 18v AC, and shuts down if the input voltage drops below 16VAC. This voltage can be measured between the anodes of diodes D3 & D4, located just right of the power supply connector on the vision computer.

### 4.3.4 Diagnostics General

Most diagnostics and error messages are displayed on the main display. A full list of error messages is displayed later in this manual.

The VISION computer board contains a LED for aid in basic fault diagnosis (located at the centre top of the computer board), where the display board is not displaying any meaningful message :

| LED STATUS | DESCRIPTION | REMEDY |
|---|---|---|
| LED OFF | Input voltage too low for computer board to start. | Check power supply. Check cables. |
| LED ON - But NOT flashing | Input voltage OK but computer not running. | Change computer. |
| LED FLASHING, approx. 2 per second. | Input voltage OK. and computer is running. | If nothing being displayed: Check - LCD board. Check - Cables from computer to LCD board. |

Note that the LED flashing at an uneven rate is also indicative of a computer board error.

Use the TEST functions STATUS DISPLAY to observe Hose Switch status and Communications status. See Test functions.

### 4.3.5 Power-Up indicator
A small "P" is displayed on the main LCD between the 1st and 2nd lines to indicate that a power up has occurred. This "P" will disappear after the first transaction has begun.
This can be useful in tracking problems caused by power supply fluctuations.

```
 13.98
 20.00          "P"- Power-Up indicator
   69.9
```

| Symptom | Action |
|---|---|
| Not working at all | • Check Power Supply, note that the Vision displays will continue to show the latest details for more than 30 minutes after a power failure. |
| Not communicating | • Check service function "Display Status" to see if : <br><br> Comms mode is set to communicating. <br> Any messages are being received <br> An excessive number of errors are occurring. <br> • Check comms type is set to the correct protocol. <br> • When running Email comms, the Gilbarco/PEC isolator must be disconnected from J12. <br> • Communications mode is only read on power up - switch power off for 10 seconds then on again or press the reset button <br> • Check fuse on computer module. <br> • Replace computer module. |
| Not Resetting | • A small dash will appear on the main display (centre right hand side) after the nozzle boot switch is activated, until authorisation is received from the controller. <br> • Check that Vision Type is set correctly and that hose switch wiring matches Vision Type. |
| Can't access service or calibrate functions | • Computer module not idle- nozzle off hook , or lock up in strange state <br> • Warmboot, or if necessary cold-boot |
| Flow does not start or stops during delivery. | Air eliminator halting delivery. Air detector is enabled, only when the product is set to DIESEL and the type is set to PUMP. <br> • Check sealing on product supply lines <br> • Check operation/termination of diesel air detector switch. |
| Totaliser recording flow when not in transaction mode, or totals not equalling sum of deliveries. | • The totaliser records fuel flow regardless of whether a transaction has been started. <br> • Check for leaking hydraulics. <br> • Check wiring between Pulser and computer, computer may be seeing "phantom" pulses, caused by poor wiring or earthing. |

### 4.3.6  Pulser Metering Circuitry

Some Pulser faults are indicated by errors 11, 12, 13 or 14 being displayed.

| FAULT | CAUSE | CHECK |
|---|---|---|
| Error 11 - Pulser cross-check error | One of the Pulser channels is not metering correctly. | - Pulser cable and termination's.<br>- Pulser unit.<br>- 5 volt power supply (computer module).<br>- Computer module. |
| Error 12 - Excess reverse counts. | A or B channels incorrectly terminated, or one of the Pulser channels is not metering correctly for the selected hose. | - same as error 11. |
| Error 13 - Excess pulse rate | An absurdly high number of pulses has been received. | - Meter is measuring air, not fluid.<br>- Same as error 11. |
| Error 14 - Fuel flow on not selected hose. | Pulsars wired up for wrong hoses or a faulty Pulser on a hose not selected. | - Pulser termination's and cabling. |

### 4.3.7  Boot Switch input circuitry

The TEST function STATUS display can be used to indicate the current switch state.

A hose switch De-bounce function is included in the Vision software to overcome problems related to intermittent switch contacts, i.e. Pump stopping during delivery. The De-bounce function provides a 200ms De-bounce period.

### 4.3.8  Gilbarco communications circuitry

The Gilbarco/PEC comms isolator has separate inputs for Gilbarco and PEC comms wiring, the inputs have inbuilt protection against wiring comms to the wrong input. Comms wiring is terminated in the termination box in the base of the pump. There is a diagnostics LED on the isolator that indicates when current is flowing through the Gilbarco communications current loop. A break anywhere in the loop will cause the LED to go out.

- Check comms protocol is set appropriately (Calibrate Functions).
- Check  GILB/PEC LINK on comms isolator is set appropriately.
- Check service function "Display Status" to see if :
  - Comms mode is set to communicating.
  - any messages are being received
  - an excessive number of errors are occurring.

**NOTE**

Communications mode and protocol type are only read on power up, apply a power up (press reset button) to invoke new settings.

PEC Protocol NOT yet implemented

### 4.3.9 Error Messages

Error messages from the computer module are displayed on the main display.

Most of the error conditions below are indicative of a fault with the computer board, except for those mentioned above.

However, some of these faults may be caused by external factors e.g. faulty power supply or wiring, excessive radio frequency interference, earthing problems etc.

**Resetting Errors**

Some of these errors are considered "fatal". To clear a fatal error, it is necessary to switch off power to the pump for at least 10 seconds.

Other errors will be reset by removing the condition, or pressing the reset button on the computer board.

If an error condition cannot be rectified by applying a reset or removing power from the pump, perform a "Coldboot" (see Initialisation).

### 4.3.10 Changing Boards

The vision computer board contains 3 programmable integrated circuit (IC) chips. Two of these ICs contain the program information , the third contains the set-up information i.e.(k-factors, totals, etc.).

When changing over a computer board, it may be necessary to swap over program chips if the version in the spare is different.

The two IC's which carry the program are U14 (EPROM), and U11 (FPGA). The IC which carries the calibration and totals information is U13 (EEPROM).

If the program in the old board is the same as in the new board, it is possible to transfer U13 (EEPROM) to the new board, and hence not lose any calibration or totals information.

| Warning |
| --- |
| The integrated circuit devices used in the vision are static sensitive. Always use standard static electricity precautions when handling any printed circuit board or integrated circuit. Static electricity often does not cause immediate failure, but degrades performance with failure at a later time. |

Note that while the EPROM (U14) and EEPROM (U13) may be levered from their sockets using a flat bladed screw-driver, but the FPGA (U11) requires a special *PLCC* tool.

## VISION ERROR MESSAGES

**Conditions Sent to Console**

| | |
|---|---|
| 1 | Pulser Error |
| 2 | Pump Computer Error |
| 3 | Price Change Occurring ( All Hoses ) |
| 4 | Weights and Measures Calculation Test |
| 5 | Pump Program Error |
| 6 | Pump Memory Error |
| 7 | Pump Power Fail |

**Processor Errors**

| | |
|---|---|
| 8 | CPU Error |
| 9 | CTC Timer Error |

**Pulser Errors**

| | |
|---|---|
| 11 | Pulser: Cross-check Error |
| 12 | Pulser: Excess Reverse Counts |
| 13 | Pulser: Excess Pulse Rate |
| 14 | Pulser: Fuel Flow on Not Selected Hose |

**Other Errors**

| | |
|---|---|
| 20 | FPGA Interrupt Test Failure |
| 23 | Under Temperature Error |
| 24 | Over Temperature Error |
| 37 | RAM Error |
| 38 | EPROM Error |
| 39 | EEPROM Error |

**Range Errors**

| | |
|---|---|
| 41 | Illegal Unit Price Value |
| 42 | Illegal 'K' Factor ( > 19.9999 ml's/pulse ) |
| 43 | Bounds Error |

**Overrun Errors**

| | |
|---|---|
| 50 | Major Cycle Task Overrun |
| 51 | Test Task Overrun |

**Restart Errors**

| | |
|---|---|
| 60 | Restart 0 |
| 61 | Restart 1 |
| 62 | Restart 2 |
| 63 | Restart 3 |
| 64 | Restart 4 |
| 65 | Restart 5 |
| 66 | Restart 6 |
| 67 | Restart 7 |
| 68 | Trap received |
| 69 | Shutdown not completed properly |

**Density Probe**

| | |
|---|---|
| 70 | Message time-out, not receiving data from Density Probe interface. |

**Software faults**

| | |
|---|---|
| 99 | Software Error |

## 4.4  Service - High Voltage board

Note that there are 2 types of Vision High Voltage boards, 1 type for *PUMPS* and another type for *DISPENSERS.*

The type intended for Pumps have 2 Motor outputs capable of driving Motors directly, outputs are fused at 15 amps. The type intended for Dispensers have outputs capable of driving Relays/Contactors, not motors directly. Outputs are fuse at 0.5amps.

**WARNING**

When wiring to the High Voltage board, note that the wiring on Connector J2 (side A valves) is the reverse of the wiring on J3 (side B valves). Observe and follow the markings on the PCB itself.

### 4.4.1  Fuses

| Fuse | Rating - Dispenser | Rating - Pump | Output |
|------|--------------------|--------------|--------|
| F1 | 63 mA  Time Lag | 63 mA Time Lag | Computer power supply |
| F2 | 0.5 Amp | 15 Amp | Motor 1 |
| F3 | 0.5 Amp | 15 Amp | Motor 2 |
| F4 | 1.0 Amp | 1.0 Amp | Lights |
| F5 | 0.5 Amp | 0.5Amp | Valve 1AS, 1AF, 2AS & 2AF. (outputs on connector J2). |
| F6 | 0.5 Amp | 0.5 Amp | Valve 1BS, 1BF, 2BS & 2BF (outputs on connector J3) |

### 4.4.2  Lighting

The fluorescent lighting consists of two independent circuits supplied by one fuse. Lights are switched ON/OFF via managers functions, or via console operation (Depending on console type).

### 4.4.3  Diagnostics

| Fault | Check |
|-------|-------|
| Lights off - both sides | • Lights have not been turned on via managers functions.<br>• Console has turned lights off (console has priority).<br>• Fuse F4<br>• Starters or Tubes<br>• Wiring termination's |
| Lights off - one side | • Starter or Tube<br>• Wiring termination's |
| Motor/Valve Output not functioning | • Fuse<br>• Vision Type set incorrectly (see calibrate functions). If the wrong type is set the output signal may be mapped to the wrong output.<br>• Wiring connections incorrectly or poorly terminated. Follow markings on board, refer installation section.<br>• Replace High voltage board |
| Motor/Valve Output causing noisy operation | • Faulty SSR circuit, replace High voltage board. |

# 5. Service - Hydraulics

## 5.1 Meter

The Wayne Dresser 2PM6 meter is a 2 piston positive displacement model, comprising essentially of stainless components within a pressure die cast aluminium housing. Metering rate is 250ml/rev.

Details of operation, troubleshooting and adjustments to the Wayne-Dresser 2PM6 meter are detailed in the Wayne 2PM6 meter manual.

Details of component spare parts are found in the attached Spare Parts Manual.

## 5.2 Pump

The Wayne-Dresser compact pump unit is a self priming positive displacement rotary type internal gear pump.

Details of operation, troubleshooting and adjustments to the Wayne-Dresser compact pump are detailed in the Wayne Compact Pumping Unit Manual, Wayne Part No. 917466A. Details of component Part Numbers for spare parts are found in the attached spare parts manual.

## 5.3 Motor

The motor/s are a 746W (1HP) flameproof motor. Of Brook Crompton Betts manufacture.

Motor faults can easily be checked according to the following procedure:

1. Remove the drive belt between the motor and the pump.

2. Lift a nozzle to initiate a delivery. The motor should freely and quietly rotate at approximately 1440RPM. If the motor is noisy and rough running the bearings may have deteriorated - replace motor. If the motor is sluggish, well short on RPM and loosing torque, a number of electrical faults within the motor may be the cause - replace motor.

## 5.4 Diesel Air Detector

Air detection is enabled when the Product is set to *"DIESEL"* and the Type is set to *"PUMP"* (see Calibration functions).

The air detector pressure switches are located near each pump. There is one pressure switch for each product. An open circuit contact indicates air has been detected, the switch sensitivity is factory set and should not be altered.

When air is detected in the product (open circuit contact) the delivery valve for that product will close. After liquid is again detected there is a 10 second delay before the delivery valve is energised, immediately after the valve is energised there is a 5 second lockout period where air is ignored and the valve will always stay open.

### NOTE:
For 2P4H with Diesel, the Diesel Hydraulics is always Product 2, and the Air detector connects to J5 Hose switch 1.

**Air detector operating sequence:**
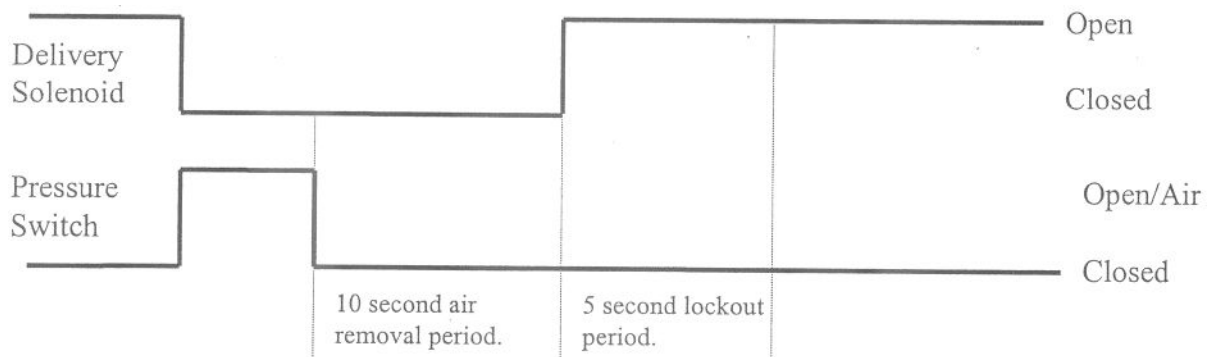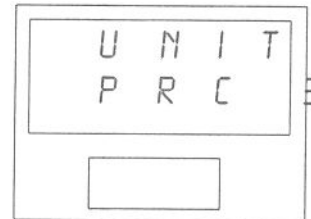
# 6. Appendix A - LPG Service Functions

This section describes the additional service functions included in LPG Dispensers.

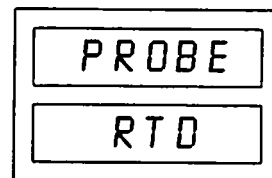## 6.1 LPG Test Functions

### 6.1.1 Display Decimal Point Position

Displays the Decimal Point format, see Calibrate function for details.

| Unit Price | |
|---|---|
| C | Cents (default) |
| 3 | 3 decimal places |
| 2 | 2 decimal places |
| 1 | 1 decimal places |
| 0 | No decimal point |



### 6.1.2 Display Probe Type:

Displays the current Probe type. Displays RTD for Temperature Probe, or DENS for Density Probe.



### 6.1.3 Display Ambient Volume and Density

The function shows the ambient volume and density used in the last transaction. If temperature correction is not being used, the ambient volume will be the same as the corrected volume.



Ambient Volume for last delivery.

Special Digit: Displays "L" for Liquid, or "error n" if vapour error from Density Probe.

Density @ 15°C. (525.0 g/l)

Volume Correction Factor. For Density Probe Systems only, the first digit is not displayed, this is how it is returned from the Density Probe. Add 1.0000 for value < .5000.
i.e. 0234 = 1.0234. 9786 = 0.9786.
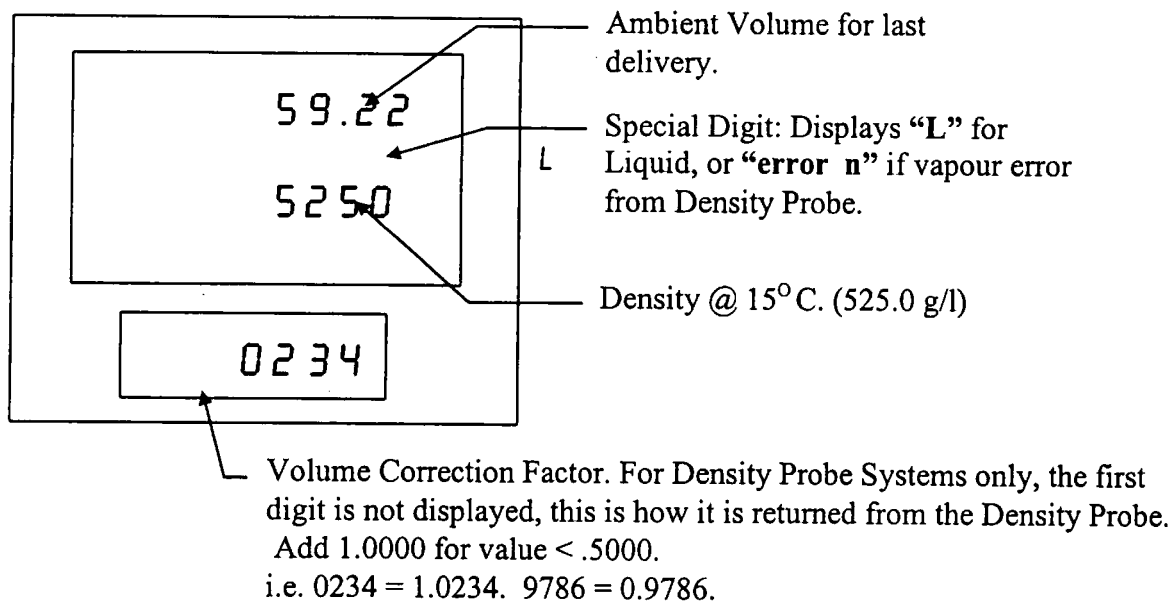
For Density Probe Systems, display includes the vapour error number from the DSS, The Special Segments display the status as follows:

- **L** – Liquid (no vapour error, comms good).
- **Density Error 0** – Bad comms from DSS. (during delivery shows error 70).
- **Density Error 1** – Density High or probe fault.
- **Density Error 2** – Density Low or probe fault.
- **Density Error 3** – Density below threshold, calibration out, or probe fault.
- **Density Error 4** – Mathematical error, or probe fault.
- **Density Error 5** – Vapour faked by test button.
- **Density Error 6** – Vapour caused by density varying too much, or probe fault.
- **Density Error 7** – Temperature out of range - High.
- **Density Error 8** – Temperature out of range - Low.
- **Density Error 9** – Undefined fault, or Interface PCB fault.

During Delivery when the Function key is switched ON and the Test Button is pressed, the pump momentarily display's the "Not Idle" message, in addition to this message the status of the Density Probe will be displayed in the special segments as above.

If the delivery is terminated due to a "No Flow Time-out", in addition to the "No Flow" message the status of the Density probe will be displayed in the special segments as above.

### 6.1.4 Display Current temperature and Temperature compensation status

This function displays the current temperature and the temperature compensation status.

The status shown is either
- "tcoff" , ie temperature compensation is disabled, or
- "tc on" , ie temperature compensation is enabled



In this example,
The current temperature of the product is 18.3 °C,
And temperature compensation is disabled.

## 6.2 LPG Calibrate Functions

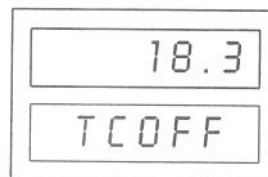### 6.2.1 Set Probe Type

Sets the current Probe type.

The options are:
**RTD** for Temperature Probe.
**DENS** for Density Probe.

```
┌─────────────┐
│ ┌─────────┐ │
│ │ PROBE   │ │
│ └─────────┘ │
│ ┌─────────┐ │
│ │   RTD   │ │
│ └─────────┘ │
└─────────────┘
```

### 6.2.2 Set Density

The density value is part of the temperature correction procedure, as the thermal expansion of fuel is a function of density. If temperature correction is not being used, the density value may be ignored. Density range is 500 to 580 kg/m$^3$.

**NOTE:** The set Density Function is omitted from the Calibrate Functions whilst the probe type is set to Density.

```
┌─────────────┐
│ ┌─────────┐ │
│ │     525 │ │
│ └─────────┘ │
│ ┌─────────┐ │
│ │         │ │
│ └─────────┘ │
└─────────────┘
```
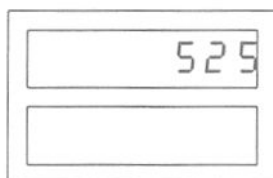
The example above shows a density of 525 kg/m$^3$.

### 6.2.3 Enable /Disable Temperature Correction

This function enables/disables temperature compensation.
When temperature compensation is enabled, the transaction volume displayed and the totals volume will be corrected for thermal expansion.

Use the UP/DOWN keys to toggle between enabled and disabled.

```
┌─────────────┐
│ ┌─────────┐ │
│ │ TCORR   │ │
│ └─────────┘ │
│ ┌─────────┐ │
│ │      ON │ │
│ └─────────┘ │
└─────────────┘
```
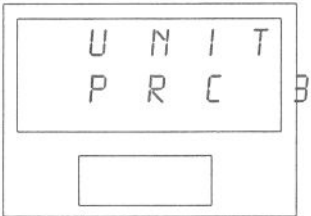
### 6.2.4 Set Decimal Point Position

The basic price calculation is fixed and the decimal points are moved to accommodate different currencies.

Use the UP/DOWN Keys to set the decimal point position as follows:

| Unit Price | |
|---|---|
| C | Cents (default) |
| 3 | 3 decimal places |
| 2 | 2 decimal places |
| 1 | 1 decimal places |
| 0 | No decimal point |



| VISION DISPLAY FORMAT | | | | | |
|---|---|---|---|---|---|
| Unit Price option | UNIT PRICE | PRESET VALUE | SALE VALUE | 8 DIGIT $ TOTALS | 5 DIGIT $ TOTALS |
| C (Cents) | 999.9 | $ 99.00 | 999.99 | 999999.99 | 99999 |
| 3 (Dollars) | 9.999 | $ 99.00 | 999.99 | 999999.99 | 99999 |
| 2 | 99.99 | $ 990.0 | 9999.9 | 9999999.9 | 99999 x10 |
| 1 | 999.9 | $ 9900 | 99999 | 99999999 | 99999 x100 |
| 0 | 9999 | $ 9900 0 | 99999 0 | 99999999 x10 | 99999 x1000 |

Printed on graphic panel

## 6.2.5 Set-up Low Flow Alarm Rate

This function allows the user to set up a minimum flow-rate, below which the Motor and Valves will be switched OFF after the selected Time-out period. The user is given a choice from a table of values. Use the UP/DOWN keys to alter the displayed value.

| Low Flow Alarm Flow-rate (Litres/Minute) | | | |
|------|------|------|------|
| 0.00 | 0.40 | 1.00 | 3.00 |
| 0.20 | 0.50 | 1.50 | 4.00 |
| 0.25 | 0.60 | 2.00 | 5.00 |
| 0.30 | 0.80 | 2.50 | 6.00 |

```
 LOALR

 L  1.50
```
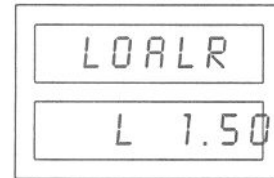
In the example above, the low flow alarm is set to occur at a flow-rate of 1.50L/min.

Note that setting a low flow rate of 0.00 means that there is a time-out after a period of zero flow.

## 6.2.6 Set-up Low Flow Alarm Time-out

This function allows the user to set up a low-flow alarm time-out. This timer starts to run when the flow-rate drops below the low flow alarm flow rate. The timer is reset if the flow-rate rises above the alarm level. The delivery is halted after three Low Flow events.

The user is given a choice from a table of values. Use the UP/DOWN keys to select the desired time-out period

| Low Flow Alarm Time-out | |
|------|------|
| 0  (There is no time-out) | 30 sec |
| 5 sec | 60 sec |
| 10 sec | 120 sec |
| 15 sec | 240 sec |

```
 LOALR

 T     30
```

In the example above, the low-flow alarm time-out is set to 3 x 30 = 90 seconds.