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## **Chapter 1 – INTRODUCTION**

#### FLEETPEC the Commercial Pump Range

The FLEETPEC represents PECs Commercial range of pumps and dispensers. Intended for businesses that have fleets of vehicles, and require their own fuelling points with static or mobile tanks. This no frills pump model has just a litres display and is currently for Diesel only.

#### **Key Features**

- Back-lit Liquid Crystal Display(s) (LCD) enables easy viewing of the litres display
- Pumping unit or dispenser options
- Inbuilt totaliser(s) which records the total volume of fuel delivered
- Single or dual holster
- Can deliver high flow or ultra high from two stacks with dual hoses
- Optional high mast with its flexible extension makes the job of pumping fuel quicker and easier, and eliminates the need to coil and hang up hoses.

#### **Intended Audience**

The FLEETPEC Operations Manual has been written for the agent installing and setting up the FLEETPEC pump at the site, the agent performing diagnostics on the pump at the site and for the drivers operating the pump to fuel their vehicles.

#### Whats In Store..

The information provided has been divided into four chapters, to enable the appropriate information to be found quickly and easily.

- Chapter 1 Introduction to the FLEETPEC range of fuel pumps and dispensers.
- Chapter 2 Describes the pre-requisite site services, installing and setting up the FLEETPEC pump.
- Chapter 3 Describes the pump operation.
- Chapter 4 Covers the pump on site servicing and diagnostics.

## **FLEETPEC Models**

#### The 'D' and 'L' series FLEETPEC range:

Pump type	Model	Description
Pump	D11H	FLEETPEC Single hose (80 lpm)
Pump	D22H	FLEETPEC Dual hose (80 lpm)
		FLEETPEC Single Hose Ultra high (130-145
Pump	L12U	lpm⁺)
Dispenser	D10H	FLEETPEC Single hose (80 lpm)
Dispenser	D20H	FLEETPEC Dual hose (80 lpm)
Dispenser	L10U	FLEETPEC Single hose (157 lpm <sup>++</sup> )
Dispenser	L20U	FLEETPEC Dual hose (157 lpm <sup>++</sup> )

<sup>+</sup> These figures are based on tested flows during certification processing:

Average flow rate achieved, using 2x 38mm suction lines and 32mm Nozzle - 145 litres per minute.

Average flow rate achieved, using 2x 38mm suction lines and 25mm Nozzle - 135 litres per minute.

Average flow rate achieved, using 1x 38mm suction line and 25mm Nozzle - 130 litres per minute.

<sup>++</sup> These figures are based on tested flows during certification processing:

Average flow rate achieved for the Ultra High Dispenser (pressure system) - 157 litres per minute

**NOTE:** The levels achievable on site will be strongly influenced by site conditions like tank placement, piping and its installation flow, check valves, hose size/length and the nozzle size. All testing was carried out using a 7metre long, 25mm diameter hose.

#### The FLEETPEC Certification Models

First digit is Series model,

D = Standard FLEETPEC – Standard/High

L = Ultra High capable FLEETPEC using Lobe meter

Second digit Number of hoses – 1 or 2

Third digit Hydraulic system type

0 = submersible turbine pump (STP) system

- 1 = single integral pump
- 2 = two integral pumps

Fourth digit Maximum flow rate

S ('standard') = 50 L/min

H ('high') = 90 L/min

U ('ultra high') = 160 L/min



#### **Pumps and Dispensers**

A *pump* or *pumping unit* has an internally mounted Pump/Air separator which is driven by an electric motor. This motor brings fuel up from the underground fuel storage tank to the nozzle. An air separator removes any air from the fuel before it reaches the nozzle.

A *dispenser* or *dispensing unit* is supplied via a submersible pump. The submersible pump is installed inside the underground fuel storage tanks. The dispenser pump configuration is a pressurised system, which pushes the fuel up to the nozzle from the underground storage tanks.

**Note:** Throughout this manual the term "pump" refers both to pumps and dispensers, unless otherwise stated.

#### FLEETPEC - Single Hose Models

Models - D11H, L12U, D10H, L10U

The single hose FLEETPEC models deliver one grade of fuel through a single hose. The standard hose configuration can be replaced with a high mast and its flexible extension for ease of use.

The hose and the *nozzle*, which is stored in a *holster*, are mounted on the end of the pump unit. Facing the front of the FLEETPEC unit with its litres and totaliser display visible, the hose and holster are normally located on the right hand side. There is an option to have the hose and holster located on the left – this option was selected prior to manufacturing the pump.





FLEETPEC Single Hose Models - High and Ultra High



#### **Display Layout**

The single hose FLEETPEC pump display consists of a litre display and a totaliser, located in the top centre of the pump's front panel. The litres display indicates the volume of fuel pumped for a single delivery. The litres display clears and resets to zero (0.00) when the nozzle is lifted for the next delivery. The maximum delivery is 9990.00 litres. The Totaliser is a mechanical tote which is set, in the factory, to record the volume delivered, in whole litres, by the pump. Only one tote is installed on the single hose FLEETPEC models and is located on the front display panel under the litres display. Fractional values from each transaction accumulate and are included in the tote count.

#### **FLEETPEC** - Dual Hose Models

Models - D22H, D20H, L20U

The dual hose FLEETPEC models deliver fuel through two hoses. Two products are possible however current certification is for Diesel products only.

One hose is mounted on each side and can be operated simultaneously. The standard hose configuration can be replaced with a high mast and its flexible extension for ease of use. The nozzles are stored in holsters, which are mounted on the ends of the pump unit.

The hose on the right end of the unit (looking from the front) is labeled 'hose A', and the hose in the left hand end of the unit (looking from the front) is labeled 'hose C'.



FLEETPEC - Dual Hose Models



#### **Display Layout**

There are two litres displays located in the pump unit's front panel. Display 1, on the right, shows the information relating to the right side hose - 'Hose A'. Display 2, on the left, shows the information relating to left side hose - 'Hose C'. The litres display indicates the volume of fuel pumped for a single delivery. The display resets to zero when the nozzle is lifted for the next delivery. The maximum delivery is 9990.00 litres.

There are two totaliser (totes) on the dual hose FLEETPEC pumps, one per display case. The totes are located on the front display panel, beneath the associated Litres Display.

The Totalisers are set, in the factory, to record the volume delivered, in litres, by a particular hose. Fractional values from each transaction accumulate and are included in the tote count.

Tote 1 will record the volume of grade delivered from hose A.

Tote 2 will record the volume of grade delivered from hose C.



## **Chapter 2 - FLEETPEC Installation**

This chapter explains how to install and set up the FLEETPEC range of fuel pumps and dispensers.

The following sections give information on:

#### Site services

- the recommended cable requirements
- the mains wiring for both the pumping and dispensing units

#### Installing the pump

- a pump installation and set up checklist detailing what needs to be done
- **Note:** The information in this chapter assumes that all pipe work, storage tanks, electrical wiring, communication cabling has been installed in accordance with local regulations.

When installing the FLEETPEC:

- ensure the fuel pipes are clear of debris and flush out prior to connection to the FLEETPEC
- ensure that, on the base of the unit, at least four bolts can be used to secure the unit to a solid, level footprint – this is essential when used in conjunction with a high mast hose arrangement
- check all the ties, fitted to prevent movement during transport, are removed before the pump is put into operation.



## Safety

#### **Electrical safety - Caution**

This equipment contains components that can be damaged by Electrostatic Discharge.

Should you ever need to service this equipment, you must follow full anti-static precautions.

Prior to servicing, earth all equipment and wear an anti-static strap.

Components must be transported in anti-static material.

#### **Intrinsic safety - Warnings**

PEC pumps include intrinsically safe circuit elements to allow their use in hazardous areas: <u>Always</u> operate a non-intrinsically safe circuit with the flameproof enclosure cover on.

Take care to <u>avoid</u> shorting out isolation or intrinsic safety barriers.

#### Environmental safety:

# TemperatureMaximum55° CMinimum-10° C

## Humidity

Maximum	95% non condensing	
Power		
Supply	230 vac	
Current maximums:		
Dispensers	1 amp	
Pumps (two motors)	10 amps	
Start current	27 amps for one second maximum per motor	



## **Site Services**

## Cabling

The following cables must be routed underground in accordance with the relevant specifications (NZS 6109 and AS 2229).

For new installations allow at least 2 metres free length above ground level for termination at the pump.

#### **Cabling for new installations**

The cable sizes listed below are recommended for new installations.

Note: Cable runs greater than 20 metres may require a size increase.

#### Mains / Contactor cable

*Either:* 1 x 3 core 2.5 mm<sup>2</sup>, Steel Wire Armoured (SWA) cable for pumps. *Or:* 1 x 7 core 2.5 mm<sup>2</sup>, SWA cable for dispensers.

Note: Maximum load 16 amps.

## **Pump Communications cable**

1 x 4 core 1.5 mm<sup>2</sup>, SWA cable.

## **Cable Layout:**

A number of methods can be used to run cables to the FLEETPEC.

- Steel Wire Armoured cables buried underground. One cable for mains and the other for pump communications.
- Two conduits; one conduit containing a mains cable and the other containing a shielded pump communications cable.
- One conduit containing both mains cable and the separate shielded pump communications cable.

## **NOTE: Cabling for existing sites**

Ensure conduit and SWA cables are terminated in the correct manner when replacing existing equipment with FLEETPEC pumps and dispensers.





## Mains wiring

All mains wiring connects to the pump via a flameproof junction box located inside the pump. The location of the junction box in the FLEETPEC is detailed later in this chapter in "Junction box".

The following two pages illustrate the "typical" mains wiring requirements for a two product pump and a two product dispenser.

The sizes of cables, isolating switches and fuses apply to all pump or dispenser mains wiring.

#### **Pumping unit**

The diagram below shows a typical mains wiring configuration for two FLEETPEC pumps. Each pump can have up to two motors.



#### Mains cable

1 x 3 core 2.5 mm<sup>2</sup> SWA cable. Maximum load : 16 amps.

#### Pump isolation switch

Key operated, double pole switch.

#### Fuse or circuit breaker

Maximum load : 16 amps.

**Note:** The cables must be routed underground in accordance with the relevant specification (NZS 6109 & AS 2229).



### **Dispensing unit**

The diagram below shows a typical mains wiring configuration for a 2 product dispenser.



#### Mains / contactor cable

1 x 7 core 2.5 mm<sup>2</sup> SWA cable. Maximum load : 16 amps.

#### Pump isolation switch

Key operated, double pole switch.

#### Fuse or circuit breaker

Maximum load : 16 amps per pump circuit

#### Pump relays

Small signal (plug in) relay. One per product for each dispenser.

Maximum load (per circuit) : 1 amp.

**Note:** The cables must be routed underground in accordance with the relevant specification (NZS 6109 & AS 2229).





## Pump installation and set up checklist

The following is a summary of the steps involved to install and set up the FLEETPEC pump. Where more information or diagrams are required, you are referred to the expanded topic.

- Unpack the pump. The pump hose, holster and storage hook are packaged separately (but in the same box) as the pump, at the factory.
- 2. Unlock the pump and remove the front panel to gain access to the fixing points on the mounting frame.

See "Removing the front panel".

3. Bolt the pump module to the forecourt using the fixing points (detailed in the footprint diagrams). Connect the fuel pipes at the same time, especially if flexible connectors are required.

See "Pump footprints" and "Connecting the fuel pipes".

**NOTE:** Please ensure that the correct approach is taken with the Air Separator/Pump atmospheric vent point, noting this point is sealed with a steel ball for transportation after manufacturer and quality controlled wet testing.

In normal **suction** type configurations a Vent Pipe assembly is supplied. This Vent Pipe assembly must be fitted to the Air Separator atmospheric vent, and this in turn must vent externally of the pump housing (angled outwards).

In **positive pressure** configurations eg where supply liquid level is at a greater height than Air Separator/Pump unit itself, it is important to consider how this will operate. There are two possible operating options to address this situation:

- 1. To completely seal off the Air Separator atmospheric vent point with Steel Ball as supplied.
- 2. To connect an appropriate tube to the Air Separator atmospheric vent point, and vent the other end of this tube into the air space of the supply tank.
- 4. Connect the mains to the junction box of the pump module.

See "Junction box" which details the Junction box location and connections.

- Remove the ties attached to the pump motors and/or pipe work. The ties are installed to ensure safe transit and are identified by a label that reads: "Attention: Modules are tied for transit. Please remove before operating pump".
- 6. Reassemble the pump hose, holster and hook to the pump unit. Note, this can be the standard hose configuration or optionally a high arm or boom pump hose.

See "Reassembling the pump hose".

- 8. Set up the pump as detailed "Setting up the pump".
- 9. Connect the non-volatile battery.

See "Connecting the batteries".

10. Replace and lock the front panel. See "Fitting the front panel".



## Removing the front panel

- 1. Insert the key into the lock, situated in the top right hand corner of the front panel.
- 2. Turn the key to the left to unlock the pump.
- 3. Lift the front panel up which allows movement out at the base



4. Lower the panel down and clear of the main unit.

#### Fitting the front panel

- 1. Align the front panel with the gap in the main unit.
- 2. Tilt the top of the panel forward at a 45 degree angle and move the top of the panel up into the main unit.
- 3. Move the base of the panel into the main unit.
- 4. Gently lower the panel down. To locate on the bottom studs
- 5. Turn the key to the right to lock the pump and remove the key.



## **Pump footprints**

#### Pumping units - central stack, standard and high flow



Pumping units – dual stack, standard, high and single hose ultra high flow



Dual pumping unit footprint





#### Dispensers - central stack, standard and high flow

Single dispenser footprint





Dual dispenser footprint





#### Dispensers - single stack, Ultra High flow





## Connecting the fuel pipes

On the footprint diagrams, the centre of the shaded circle(s) represents:

- the pump inlet point, for the pumping unit.
- the centre of the flange for the meter inlet pipe, for the dispensing unit.

A non-return value must always be used on the suction pipe.

If the suction pipe and the pump inlet cannot be joined by a straight pipe use a flexible connector.



#### Flexible connector and non-return value

Where a flexible connector is required, the length of the connector must be taken into consideration when determining the required height of the suction pipe flange.

A Cim-Tek spin on 10 micron filter is supplied as an option for standard and high flow dispensing units and is fitted to the suction pipe.



Dispensing Filter Unit

#### Junction box location - single hose Standard/High FLEETPEC



The following diagram shows, in schematic form, the position of the Junction box in the pump and dispenser units on the single hose FLEETPEC models.



## Junction box location - dual hose Standard/High FLEETPEC

The following diagram shows, in schematic form, the position of the Junction box in a pumping unit and a dispensing unit on a dual hose model.



**Note:** The Ultra High flow pump with dual motor/air separator and its single hose requires a check valve which is supplied. This means that the bottom flange off the check valve is only 35mm from the bottom of the FLEETPEC frame. This can be view in Appendix B.



#### Flameproof Junction Box connections

To access the junction box connections, loosen and remove all 10 bolts securing the cover plate NOTE: When replacing the cover ensure all 10 screws are tightened to 8-10NM torque



FLEETPEC pre WET testing – no main cable or its required gland is installed – only the essential varistor is visible in the Terminal block

Cabling must enter the junction box via "Flameproof SA certified Glands". This type of gland depends on the cable used. For instance, steel wired armoured (SWA) cables requires a different gland from the TPS cable that is run in conduit. The gland would replace a brass M20 flameproof plug and is NOT supplied with the pump.



#### Installation connections

#### Pump mains cable

The three core mains cable for a pumping unit connects, in the junction box, to Earth (E) and the neutral (N), phase (A) in parallel with the supplied variator on the MAINS IN connector block.

#### Dispenser mains cable

The dispenser mains cable is a 7 core cable. Three of the cores connect to the junction box Earth (E) and neutral (N), phase (A) in parallel with the supplied varistor on the MAINS IN connector block.

One or two cores to Relay 1 (Motor 1 for pumping) and/or Relay 2 (Motor 2 for pumping).

The 2 or 3 remaining cores are not used and should be cut off.

#### Pump communications cable – not in flameproof box



The pump communications cable connects directly through the left side display box plug - 2 cores connect to the "POS signal" on the main processor board within the box. There are two signal types - the default voltage loop of the PEC protocol and the Australian Gilbarco protocol with current loop (30mA). Critical jumpers MUST be set to change protocol, **BEWARE** critical processor damage can occur if signal does not match jumper setup – this a **NON Warranty PCB** replacement. The cable end is pre-cut ready for connection to the site communication line. Ensure the phasing of the communications cabling is consistent throughout the site - always connect the black core to the black terminal.



## Reassembling the pump hose

There are three different pump hose configurations that can be used with the FLEETPEC pump. The standard configuration supplied with the pump, or optionally a high arm or a boom pump hose.

#### Standard pump hose reassembly

The following instructions detail the reassembly of the standard pump hose configuration that is supplied with the FLEETPEC pump hose hook, holster and the supplied hose/nozzle.





End of pump unit

Parts to be connected to the pump

- 1. Ensure the front panel is removed. Attach the hose hook to the end of the pump with two supplied screws.
- 2. Fit the holster into the holster slot and screw into place.
- 3. Inside the pump unit, connect the unattached black wire from the Display module, with the 2 pin connector, to the connector at the base of the holster (as indicated in the picture below).



This is a switch, that is activated when the nozzle is removed from the holster, the pump motor starts and the litres display resets to 0.00, ready to display the pending delivery's volume.

- 4. Screw the hose onto the outlet pipe and tighten.
- 5. Place the coiled hose over the hose hook and place the nozzle in the holster.



## Other hose suspension options

## High Mast pump hose assembly





## Setting up the pump

Before setting up a FLEETPEC pump you need to be aware of the different modes in which the pump can operate.

#### **Modes of operation**

#### Standalone mode

The FLEETPEC is in standalone mode when it is not connected to any card reader or POS control system. The pump stacks do not need a pump number, and the first 3 DIP switches on the display board can be left at the factory setting, all OFF.

When the pump is turned on all set up functions are performed automatically, at the FLEETPEC itself. The FLEETPEC is "on its own" anyone lifting a nozzle can deliver fuel without authorization.

#### Card/TAG reader or POS system controlled mode

The FLEETPEC can operate in conjunction with a card reader or POS control system, which sends the delivery information to a central controller (for example: PCS 220, 8850, G5 solution) and uses PEC or Gilbarco Australian protocol to control the pump operation. The central controller makes the signal call to authorize the pump or not once access is confirmed or payment made.

Dips are used to set pump numbers. If you use the service functions to set pump numbers it will **always** look at the function setting for the pump number from then on, even if you set it to 00. The only way to go back to recognizing and using the dips switches is to either

• change/move any dip switch (1-3) and power reset

or

• use function 10 - 10, FILL, FILL (Memory Erase)

In this mode, each pump stack must be allocated a pump number. The controller uses this number to identify and control the unit. The pump number must correspond to the number that the "controller" has internally assigned to that pump. The pump number can be set using **DIP switches or the normal PEC setup function 20** for stack A in single hose FLEETPECs and if a **Dual hose – function 41** for the second pump (or the left stack C).

#### **Temporary standalone**

This is an emergency feature for FLEETPECs connected to a card reader or POS control system. You should only put FLEETPEC in this mode if the "controller" has failed or being upgraded (temporarily) and deliveries are being controlled manually at the pump. Refer to the section 'Setting the pump to temporary standalone' in chapter 4 'On Site Servicing'.

If you change the FLEETPEC to temporary standalone mode, you **must not** change the pump number. When the controller fault or upgrade is corrected, the pump automatically returns to the card reader or POS system controlled mode (and uses the pump number).



## Pump set up procedure

## **Standalone Mode**

If the pump is to operate in **standalone mode**, no further setting up is required, during the manufacture and final testing phase the pump will have been setup and left with the correct system DIP switches just turning the power on to the pump is start up in the correct mode.

#### Card reader or POS system controlled mode

For pumps operating in **Card reader or POS system controlled mode** you need to allocate pump numbers:

 using the DIPswitch settings on the Display board. When the FLEETPEC is first turned on the pump will automatically enable itself and set the pump number(s) according the DIPswitch settings on the Display board. (see "Removing the Display panel" and "DIPswitch settings" in chapter 4 'On Site Servicing')

OR

2. using PEC Functions mode power on pump, put the pump into diagnostic mode and use Function 20 and/or 41 to set pump numbers and make hoses active with 22 for right hose (Stack A) and 43 for Left hose (Stack C).

See "Setting pump number" Functions 20/41 in chapter 4 'On Site Servicing'

**NOTE:** Hoses active happens automatically on pump power up. The processor looks at side A display DIP switches for 'single' or 'dual' and sets appropriate hoses active automatically.

**NOTE:** Where a pump number greater than 7 is required for a single hose pump, or greater than 14 for a unit a dual hose pump, then the pump number can be assigned using Functions 20/41.

## **Connecting the battery**

**Ensure you have setup** the pump (DIP switches and functions) before you connect the **non-volatile RAM battery** on the Processor at J1.

The 5V lithium battery is fitted to maintain non-volatile RAM which supports the settings.

The pump leaves the factory with the non-volatile RAM battery *disconnected* the jumper is only on one PIN of J1.

#### Connecting the 5 V non-volatile RAM battery

Connect the jumper across pins 1 and 2 of the J1 connector when the jumper is not connected it is simply positioned on one leg(pin 1).



## **Chapter 3 – FLEETPEC Operation**

## Delivering fuel

The way fuel is delivered depends on the configuration of the FLEETPEC pump.

The procedure differs for the following situations:

- 1. Delivery from a standalone FLEETPEC, the pump is not connected to a card reader or POS system.
- 2. Delivery from a card reader or POS system controlled FLEETPEC.

#### **Replacing the nozzle**

If, during any delivery, there is no product delivered for 1 minute the FLEETPEC will automatically start beeping, after a further 1 minute the pump / dispenser motor will stop.

To clear the beep return the nozzle to its holster.

#### Standalone deliveries

The following two procedures relate to the FLEETPEC as a standalone unit, i.e. the pump is not connected to a card reader or POS control system.

## **Direct delivery**

- 1. Lift the nozzle for the grade of fuel you require.
- 2. Insert the nozzle into the fuel tank of your vehicle and squeeze the nozzle trigger.
- 3. Release the nozzle trigger to finish the delivery. Replace the nozzle in its holster.
- The *Litres* display flashes all segments, blank outs and then resets to zero.
- The Litres display increments accordingly.





#### Fuel Controller delivery

This occurs when the FLEETPEC units are electronically locked via the Fuel controller card reader or POS system. The pump cannot deliver fuel without authorisation from the central controller.

This Fuel controller can use either PEC 6 digit protocol or Gilbarco Australia 6 digit protocol to manage access and authorisation of the pump nozzles.

To authorise the pump with an access control system using system cards or RF tags with or without PINs, successful access allows authorization of the pump for delivery. The control system may have delivery volume limits per access, daily limits or numbers of deliveries per day.

#### **Temporary Standalone**

If, for any reason, communications between the pumps and the card reader or POS system fails, the FLEETPEC unit can be set run in standalone. This is done by setting the FLEETPEC into 'Local' mode using Function 04 in the service functions on the FLEETPEC. 'Local' is the abbreviation used to indicate 'Temporary Standalone Operation'.

See the section titled "Accessing the service functions" in chapter 4.

#### **Mains Power**

If a mains power cut occurs the pump will slow beep and power down immediately. The setup information is retained in the FLEETPECs memory by an internal battery.

When the mains power is restored the lights behind the displays come on and the FLEETPEC sounds one beep then six beeps. For the first delivery after the power is restored, the Litre display will first show the horizontal bars during pressurization this occurs after re-powering or after 4 hours idle.

On power up, the FLEETPEC automatically enables itself, sets the active hoses and sets the pump number(s). See chapter 4 'On Site servicing' for information about how the pump numbers are set.



#### **Resolving faults**

If something happens you do not understand, or the FLEETPEC does not allow a delivery, use the following checklist:

ing chockiet.	
Symptom	Reason
All nozzles are replaced but the displays are flashing.	
Display shows 'OEE'	Complete the transaction. Remove a nozzle to display the error code, for example ERR19. Contact your service agent and quote the error code. Switching the FLEETPEC off for 30 seconds may make the unit operational (this depends on the type of error causing the problem)
	The FLEETPEC has lost its setup information. Switch the pump off and then on. The pump will automatically enable itself and set the pump number(s).

The FLEETPEC repeatedly beeps for up to a minute.

The FLEETPEC beeps several times at power on, you cannot deliver any fuel, the pump does not respond to the card reader and the display(s) are blank. The nozzle has not been replaced.

Contact your service agent – the number of beeps is an important indicator – listen and record the number that you hear, this will help servicing



## **Chapter 4 - On Site Servicing**

#### Accessing the display panel

- DIP switch settings, turn on Functions mode and accessing agent functions
- Servicing Encoder and nozzle connection
- Main processor and Power regulator PCB connection and setup
- Display PCB and totaliser connection and operation
- 1. Remove the pump's front panel. Unlock with key, lift and while up, pull out panel at the bottom See chapter 2 Installation.



2. Loosen (and leave in place) the 6 screws securing the display panel. Carefully tilt the display panel out from the display box.



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## Accessing the display board

The display board is secured to the panel by 4 plastic dome nuts, remove these to gain access to the dip switch setting and other connectors on the underside of this board.



## **DIP switch settings**

 On the Display board (2A83931) check the eight DIP Switch block. Ensure the model switches (4,5) are set correctly. DIP 6 is for Pump (OFF) or Dispenser [Ultra High Pump] (ON) and J1 beside the DIP switch block is for display mode. Jumper on J1 indicates Master display box while J1 OFF is a slave display in a Dual FLEETPEC situation.



Display Board



#### **DIP Switch setting for older EPROM V4.01b**



#### **DIP Switch setting for EPROM V4.60b onwards**

Switch	Function
1	
2	PUMP number allocation - see separate
3	lable
4	FLEETPEC MODEL Single ON Dual OFF
5	FLEETPEC MODEL Single OFF Dual ON
6	Dispenser (Ultra High Pump) <b>ON</b> Pump (High) <b>OFF</b>
7	Not used
8	Float Switch YES <b>ON</b> NO <b>OFF</b>



Single Hose Pump





**NOTE: DIP Switch 6:** Dispenser or Pump option relates to valve control – the Ultra High pump uses valves and therefore requires this dip switch has to be **ON** 

**NOTE:** When DUAL displays used these settings **ONLY** apply to stack A. The second display board has **ALL DIPs** set to **OFF** and the DISPLAY jumper **J1** is OFF (Disconnected)

For a card reader or POS system controlled pump, a pump number must be assigned by setting DIP switches 1, 2 and 3 as indicated in the following tables.

Pump Numbers	DIP 1	DIP 2	DIP 3	Pump Numbers	DIP1	DIP2	DIP3
Local	OFF	OFF	OFF	Local	OFF	OFF	OFF
1(A)	ON	OFF	OFF	1(A), 2(C)	ON	OFF	OFF
2(A)	OFF	ON	OFF	3(A), 4(C)	OFF	ON	OFF
3(A)	ON	ON	OFF	5(A), 6(C)	ON	ON	OFF
4(A)	OFF	OFF	ON	7(A), 8(C)	OFF	OFF	ON
5(A)	ON	OFF	ON	9(A), 10(C)	ON	OFF	ON
6(A)	OFF	ON	ON	11(A), 12(C)	OFF	ON	ON
				13(A), 14(C)	ON	ON	ON

Single Hose - Pump Number Settings

Dual Hose - Pump Number Settings

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#### The DIP Switch vs Function settings

The Dipswitch settings only cater for single hose pump numbers up to 7 and dual hose pump numbers up to 14. Higher pump numbers can be allocated using Functions 20/41. Remember Service Function setting of pump number (20,41) permanently OVERIDES DIP settings if used, until a memory clear is performed 10, FILL, FILL . If you change the DIP switch setups, on next power reset it will follow the DIP switch settings.

#### **GENERAL RULES:**

- Use DIP settings for pump numbers where possible.
- Hoses active are automatic on power reset even if turn them off in functions, you cannot **deactivate** a hose awaiting service or parts it must be locked down to avoid operation.

#### **DUAL Displays**

For pumps with 2 displays remove the display panel on the right hand side to access the power regulator, processor PCB, nozzle/encoder connections, access setup functions or access DIP switch settings. The left display on Dual pumps is a slave with only three cables to power and run data for Stack C Display PCB and its Totaliser.





#### Accessing the service functions

All service functions can only be accessed from within the display box. As an additional security feature there are certain functions that need agent level function access to operate.

- 1. Ensure all transactions are complete and the nozzles are stored in their holsters.
- 2. Remove the pump's front panel. See chapter 2 Installation.
- 3. Unscrew the 6 captive screws securing the display panel and tilt the display panel forward. For a pump with two displays access the display on the right hand side.

To turn on service functions and access agent level function requires three actions once you have the display box open. You are not required to remove the display PCB unless wanting to alter to check jumper settings.

a) Connecting a separate Ceepec keypad to P2. Ensure correct orientation.



b) Place a jumper on P3 Pin 1 & 2. This puts the pump into function mode



Key – PIN 1 Key – PIN 2 Agent – PIN 3 Agent – PIN 4 SHORT

This photo shows test connector – blue top pair in photo (1/2)

c) Once in functions mode the agent level access can be entered by a temporary short at P3 Pin 3 and 4. Access to this level is indicated by a long beep.



4. On the Display board the 6 digit display would change from

- 5. Using the keypad, press the numbers corresponding to the function you want to perform and press the FILL key.
- Press the CLEAR key to leave any setup function. If you enter a setup NOTE: function and do not press any keys for 30 seconds, the FLEETPEC beeps and automatically exists the function you selected.

The *litres* display again shows

Examples:

- Set pump number on stack A to 4 press 20, FILL, 4 FILL
- Set pump number on stack B to 12 press 41, FILL, 12, FILL

#### *Exiting the service functions*

- 1. If you connected a keypad to P2 then disconnect the keypad.
- 2. Remove the jumper from P3 Pin 1 & 2. This sets the pump to normal delivery mode and the display will show
- 3. If you removed the Display board from the Display panel, secure the Display board to the Display panel using the 4 plastic dome nuts.
- 4. Insert and tighten the 6 screws to secure the Display panel back into place.
- 5. Replace the pump's front panel. See "Refitting the front panel" in chapter 2 Installation.





## **Service functions**

The following list details the functions numbers for any model of the FLEETPEC pump. Diagnostic functions are denoted in the following function list by an asterisk(\*).

Function Number	Description
04	Temporary standalone mode
07	Liquid crystal test
15	Nozzle finalisation
16	Startup delay(default 005, 0.5 secs, Dispenser 040-060, 4-6 secs)
20	Set pump A number
30	Pump A Stack test
41	Set pump C number
50	Pump C Stack test

#### Temporary standalone mode

Enables **card reader or POS system controlled** pumps to operate independently in the event of communications failure or POS fault. Pump automatically resumes card reader or POS system controlled operation when communications are restored.

• Type 04 and press FILL. This displays LOCAL press another FILL to confirm.

## Liquid crystal display test

The test enables you to check each segment of each display (Litres).

Type 07 and press FILL. The test consists of the following:

- 1. The decimal points and colons of all the displays are simultaneoulsy turned on and then blanked out.
- 2. Individual segments of all displays are simultaneously turned on and then blanked out in the following order: e d c g f a b.
- 3. For each display, the colon is turned on and blanked out followed by all segments of each digit being turned on and blanked. That is, the figure 8 is walked through the each display on the FLEETPEC.
- 4. Segments a c d f g (the figure 5) are turned on and follow the figure 8 through across the display.

This test is continuous. Press the CLEAR key to stop the test.

04

07



#### **Nozzle Finalisation**

This function allows control of when the delivery end completes for a **card reader or POS system controlled pump.** This sets when the pump sends the transaction total to the central controller based on nozzle placed back in the holster or under set delivery limits like preset, prepay or system set delivery allocation limits.

#### "Wait for nozzle" preset finalisation (Default setting)

The pump will send the sale information through to the central controller once the nozzle has been replaced into its holster.

#### "Normal" preset finalisation

The pump will send the transaction information through to the central controller as soon as the delivery has been completed (e.g. preset limit reached, pump allocation limit reached). The nozzle does not have to have been replaced into its holster.

#### If you need to change the option:

1. Access the Service Agents diagnostics by shorting out P3 P<sup>3</sup> and P<sup>4</sup> (with a screwdriver or similar).

- 2. Type 15 and press FILL.
- 3. Press any key to change

either: dF-n1 (must replace nozzle - Default setting)

- or: dF-nL (transaction finish)
- 4. Press **FILL** to confirm the change.
- 5. Exit the diagnostic functions.

#### Setting pump number

This service function is applicable to **card reader or POS system controlled** pumps, where a pump number greater than 7 is required for a single hose pump, or greater than 14 for a unit on a dual hose pump. Pump numbers less than these are set using the first 3 DIPswitches on the Display board.

**Note:** For these function set pump numbers, to be retained if the pump is powered off, you need to ensure the 3 pump number DIPswitches are **not** set to Local (i.e. all OFF).

The pump number, set at the pump, **must** correspond to the physical number the central controller has assigned to that pump. Depending on the pump model, there may be from 1 to 2 actual pumps in each pump housing.

\*15

#### 20 / 41

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#### To set the pump number:

- 1. Access the service functions.
- 2. Key in the function number of the *pump number* you want set, (e.g Litres display Fn-20A) and press the **FILL** key.

FLEETPEC Model	Hose	Function number
Single hose	А	20
Dual hose	А	20
	С	41

**Note:** DIP switches should be used to set SINGLE pump number 1-6 and DUAL pump numbers 1-14 with function pump numbers used for singles 7-32 (PEC) and 7-16 (Gilbarco) and duals 15-32 (PEC) and 15-16 (Gilbarco)

- 3. Key in the pump number, from 7 to 32(maximum 16 for Gilbarco) inclusive for a single hose and from 15 to 32(maximum 16 for Gilbarco) inclusive for a dual hose pump (e.g. Litres display PA-15A) and press the FILL key.
- 4. To set the pump number for hose C on a dual hose pump; type 41, key in the assigned pump number from **15** to **32(maximum 16 for Gilbarco)** inclusive (e.g. Litres display PA-16C)and press the **FILL** key.
- **Note:** The unit does not permit more than one physical pump to share the same pump number (an internal speaker beeps if an attempt is made to assign a pump number already used.)
- Note: Keeping a *Pump Number Map* for easy reference is recommended.

#### Pump stack test

\*30/50

This test checks the operation of the pump motors, (internal or submersible), the nozzle switches and ability to independently operate of valve(s) and the motor.

Note: Current the Stack test does not work properly if you have DIP 6 ON for valve control

Pump Motor	Function Number
Α	30
С	50

- 1. Access the service functions. Press the function number 30 or 50. Press the **FILL** key.
- 2. Press 1 to start the motor and 1 to stop.

The first digit gives the rate of flow for the hose, in tens of litres per minute, and the second digit counts the number of encoder errors received. The pump will display a number between 0 and 9 to indicate a relative flow rate. Press 7 to access full flow rate and 8 to return to first screen.

3. Check signal status of devices - on display status indicators shows in Litres display:

**10.** -. . **P** Tenth Flow/Air sense Left/Encoder error/Air sense Right/NozzleA/Nozzle C

4. Press the **FILL** key to stop the motor.

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5. To test the nozzle switch remove the nozzle from the hostler. The decimal point between the set of two figures indicates the nozzle switch is open.

#### Display case components and connections



- **Power Regulator** provides double redundancy for our intrinsically safe circuitry with 15V supply from the PSU/AC flame proof box through cable entry 9. Provides power and 50 Hertz on 3 wires to the processor while the other two (wire/yellow) provide the AC control comms signal between the processor board and the AC Control PCB. The 5 volt supply of this PCB is indicated by cable 12 connecting to P2 on the processor board.
- Main Processor acts as the pump controller with battery backed RAM, EPROM and outputs for Card/POS systems and controlling signal lines to/from motors, nozzles and encoders. Bottom left corner area has the POS signal jumpers and signal connection. The pump can be controlled using PEC (Default) or Gilbarco Australian protocols. The POS signal connection enters at cable gland 1.

**Note:** Connecting the wrong signal when the jumpers are set to PEC or Gilbarco can cause PCB damage, always power OFF, disconnect POS signal and check the 5 jumpers BEFORE reconnection of POS signal and power ON.

- Logic Interconnection PCB provides signal connections to the Main Processor board for air sense (13,14), encoders (4, 6), nozzle switches (5, 7) and the two wire (Yellow/White) AC Control signal that provide controlled switching of motors/valves.
- Other Cabling

Cable **2** is the Totes link to the second display on a dual, Cable **3** is from the PSU Flameproof box as the backlight power supply. Cable **8** is the totes data signal from the Processor board. Lithium Battery 15 with its jumper to the right, ensure jumper on.



## Display PCB underside



**Display PCB** provides Litres display with backlighting and mechanical Totaliser. The PCB is held in place with 4 plastic dome nuts. The following parts/cables are visible without removing the PCB:

**1** Power supply for the backlighting from the PSU/AC control flame proof box.

**2** Service mode place jumper on PIN 1 & 2 and for agent level functions short PIN 3 & 4. The PINOUT numbers at position 2 run vertically with PIN 4 being closest to the plastic dome nut.

- **3** Ceepec keypad for operating service mode functions. Ensure correct orientation.
- 4 Display power and data cable connection.
- **5** Mechanical TOTE power connection.
- 6 Mechanical TOTE fitted with metal bracket.
- 7 Mechanical TOTE data signal from Main processor.



#### **Display PCB underside**



The Display PCB shows the separate LCD PCB for the Litres display, backlight power connection (1 - P1 on the segment PCB), display data ribbon (P1) connection and the TOTE with its data connection (4 - P5) on the top edge. The DIP switch block (2) and Display jumper (3) allow configuration of the FLEETPEC pump/dispenser.



The critical control setup is based on the jumper set SW1-8 and display location J1. On single hose, single display and righthand (Stack A) display on a Dual display FLEETPEC always has J1 ON. The second display in a Dual FLEETPEC is a slave of the Stack A display only containing the Display PCB and always has J1 OFF and ALL DIP switches OFF.

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## PSU/AC Control Board (2A82806) - newer model, extra valve point



This assembly is missing the required varistor across A - N in conjunction with the mains cable

The combined PCB allows mains connection with varistor. The AC control side allows for two sets of motor (Pump) or relay (Dispenser) and two single stage valves. The intrinsically safe power (15V and 50 Hertz signal) comes off JP1 and connects to the Power regulator input in the Display box. AC Control signal comes off JP2 and connects to Processor via the Logic interconnect PCB in the Display box. There are two LED indicators: LED1 beside the large capacitor is the 50 hertz signal, LED2 centre right is the AC Data – should always be solid but if flashing means it is not getting AC Data signal from the processor board.



During manufacture the backlight power supply PCB (82816) is added to the PSU/AC Control PCB, it provides to output lines 5 PIN (4 Wire + 1 KEY) to supply LCD display backlight power to the display(s).





### **Dual Flameproof Box**

This view shows a test system with temporary mains connection but indicates key points:

- Varistor on mains input in parallel with live and neutral critical that it is fitted
- The mains ternmination only has this ONE point so cabling power for card or POS systems must be joined and terminated with mains entry cable and its varistor
- Flameproof Gland entry for each stacks Motor there is no valve on this model
- Two Flameproof glands 5 wire outputs to supply backlight power in each display
- Top right non visible Flame proof gland Intrinsically safe power supply to power regulator (3 wire -50Hz and 15V) and AC Control comms signal (2 wire) to processor
- Unused connection in this model Relay and Valve connections for each stack





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## **Appendix A**

## Ultra High Flow - FLEETPEC models L12U, L10U, L20U

## Flameproof Junction box

The Ultra High Flow model junction box differs in having extra connections for valve cables, as shown below. This diagram highlights the essential VARISTOR that must be fitted in parallel with the mains supply (A-N).





#### Switchable Flow rates

The Ultra High Flow model has a simple switch mounted on the same side of the unit as the holster and outlet pipe which switches the output between High and Ultra High flow rates.

The switch is marked with a tortoise and a hare to indicate High (approx. 80 lpm) and Ultra High (up to 157 lpm) flow rates.



The photograph below shows a view of the Ultra High Flow model with the front cover removed. Note the cabling from the flow rate switch.





## *New Encoder for Ultra-High Flow Commercial Pumps/Dispensers* (2A33866)

- 1. Introduction.
  - 1.1. A new encoder (pulser) device has been developed for use with the Tatsuno Lobe Meter used in the Ultra-High Flow commercial pumps and dispensers range. The encoder uses a "Hall Effect" device to detect the rotation of a magnet which is mounted at the end of a shaft within the meter body. The magnetic field is coupled to the Hall Effect device through an aluminium cover plate, which negates the need for an extended shaft and seal.
  - 1.2. The new encoder outputs a two channel quadrature pulse stream which is compatible with other PEC encoders. The encoder output provides the PEC standard 800 "counts" per litre of fuel.
  - 1.3. The Lobe Meter has no mechanical adjustment in its design, so the new encoder incorporates a calibration facility which can compensate volume errors within a  $\pm 2\%$  range, with a resolution of approx.  $\pm 0.1\%$ .
- 2. Normal Operation.
  - 2.1. Dip-switch SW2.1 should be set to OFF for normal meter rotation direction.
  - 2.2. At low delivery speed, the led will flash once for each revolution of the meter shaft. At higher speeds, this will appear as continuous blinking.
  - 2.3. The encoder automatically compensates for small backward flows of fuel product without causing an error to be indicated by the main processor. Larger (or continuous) backward flows will trigger an error state, and will be indicated on the encoder pcb by a 10 flash blink sequence of the led.
- 3. Magnetic field strength check.
  - 3.1. With no fuel flow (but with encoder activated, i.e. by lifting the hose nozzle), if the led does a "double flash" once every two seconds, then the magnetic field strength is out of the optimal range for the Hall Effect device. The encoder will still indicate fuel flow accurately over a much wider field strength range, but the cause should be investigated and rectified.





- 4. Calibration process
  - 4.1. Remove the encoder cover to gain access to the encoder pcb assembly.
  - 4.2. Select the calibration vessel volume using SW2 dip-switches 2, 3 & 4 as in the table:

Volume	1	2	3	4
220 litre	OFF	OFF	OFF	OFF
200 litre	OFF	ON	OFF	OFF
100 litre	OFF	OFF	ON	OFF

- 4.3. Prepare to take a test delivery, and release the nozzle switch, but do not commence delivering fuel yet. Wait for the 8's and 0's on the display.
- 4.4. Press and release the "Calibrate" button SW1 on the encoder pcb. This will be registered by a 5 flash blink sequence, followed by a single flash once per second. The encoder is now in calibration mode.
- 4.5. Fill the vessel to the calibration mark. (Don't hang up the nozzle yet.)



4.6. Press and release the "Calibrate" button SW1 again. If the recorded delivery volume was within the expected range, then there will be an immediate short blink sequence of a length related to the recorded error from the nominal for the vessel (no flash if the error is zero). This will be followed 1.5 seconds later by a 5 flash blink sequence to indicate successful completion of the calibration process. If the recorded delivery volume was outside of the expected range, then there will be a 25 flash blink sequence to indicate an unsuccessful calibration run. The encoder calibration will then be restored to its previous state in this case.

Example:

- 4.7. Now hang up the hose nozzle.
- 4.8. Re-fill the test vessel to confirm a successful calibration run.
- 4.9. Replace the encoder cover. Provision is made for a locking wire with lead seal.



## **Appendix B**

## Ultra High FLEETPEC Pump – L12U

- Standard FLEETPEC display and flameproof box
- Tatsuno Lobe meter positive flow
- New PEC Encoder allows calibration setup and sealing point.
- Triangle flow splitter fed by two Tatsuno pump air separators
- Flow adjustment to load balance the two pumps with pressure gauge test point
- Single stage 1 ¼ inch Asco Valve
- Switchable flow rate high or low, one motor stopped
- Check valve and flange supplied









## Fuel Delivery Path

- Flange off alloy flow collector
- Pressure Gauge Test point off flange
- 32mm Tatsuno Lobe meter
- Delivery Piping to valve
- 1" Solenoid Asco valve
- External vertical elbow
- Flow Switch below exit

## Load Balancing the L12U

Prior to full test testing and calibration sequence with encoder the dual pump configuration has to be carefully load balanced using a pressure gauge. If changing pumps on this model refer to PEC technical support for full instructions.







## 32mm Tatsuno Lobe Meter



Tatsuno Meter with PEC Hall Effect Encoder - magnet embedded into drive shaft





## Ultra High Dispenser FLEETPEC L10U





#### Ultra High Dispenser - Hydraulics

