FILLMASTER INSTALLATION and SERVICE MANUAL

Fillmaster Installation and Service Manual

Version 1.1.5

Model: Fillmaster

Date: 9th April 2025

compac
INTEGRATED REFUELLING SOLUTIONS

Conditions of Use

- Read this manual completely before working on, or making adjustments to, the Compac equipment.
- Compac Industries Limited accepts no liability for personal injury or property damage resulting from working on or adjusting the equipment incorrectly or without authorization.
- Along with any warnings, instructions, and procedures in this manual, you should also observe any other common sense procedures that are generally applicable to equipment of this type.
- Failure to comply with any warnings, instructions, procedures, or any other common sense procedures may result in injury, equipment damage, property damage, or poor performance of the Compac equipment.
- The major hazard involved with operating the Compac C5000 processor is electrical shock. This hazard can be avoided if you adhere to the procedures in this manual and exercise all due care.
- Compac Industries Limited accepts no liability for direct, indirect, incidental, special, or consequential damages resulting from failure to follow any warnings, instructions, and procedures in this manual, or any other common sense procedures generally applicable to equipment of this type. The foregoing limitation extends to damages to person or property caused by the Compac C5000 processor, or damages resulting from the inability to use the Compac C5000 processor, including loss of profits, loss of products, loss of power supply, the cost of arranging an alternative power supply, and loss of time, whether incurred by the user or their employees, the installer, the commissioner, a service technician, or any third party.
- Compac Industries Limited reserves the right to change the specifications of its products or the information in this manual without necessarily notifying its users.
- Variations in installation and operating conditions may affect the Compac C5000 processor's performance. Compac Industries Limited has no control over each installation's unique operating environment. Hence, Compac Industries Limited makes no representations or warranties concerning the performance of the Compac C5000 processor under the actual operating conditions prevailing at the installation. A technical expert of your choosing should validate all operating parameters for each application.
- Compac Industries Limited has made every effort to explain all servicing procedures, warnings, and safety precautions as clearly and completely as possible. However, due to the range of operating environments, it is not possible to anticipate every issue that may arise. This manual is intended to provide general guidance. For specific guidance and technical support, contact your authorised Compac supplier, using the contact details in the Product Identification section.
- Only parts supplied by or approved by Compac may be used and no unauthorised modifications to the hardware of software may be made. The use of non-approved parts or modifications will void all warranties and approvals. The use of non-approved parts or modifications may also constitute a safety hazard.
- Information in this manual shall not be deemed a warranty, representation, or guarantee. For warranty provisions applicable to the Compac C5000 processor, please refer to the warranty provided by the supplier.
- Unless otherwise noted, references to brand names, product names, or trademarks constitute the intellectual property of the owner thereof. Subject to your right to use the Compac C5000 processor, Compac does not convey any right, title, or interest in its intellectual property, including and without limitation, its patents, copyrights, and know-how.
- Every effort has been made to ensure the accuracy of this document. However, it may contain technical inaccuracies or typographical errors. Compac Industries Limited assumes no responsibility for and disclaims all liability of such inaccuracies, errors, or omissions in this publication.

SYSTEM CERTIFICATION
ISO 9001
SGS

Product Identification

Specifications	
Manual Title	Fillmaster Installation and Service Manual
Original Publication Date	08/06/2018
Models Covered	This manual applies to the Fillmaster and Fillmaster Ex ***NOTE:*** *Do not use this manual for earlier models. Contact Compac for archived manuals if required.*

Validity

Compac Industries Limited reserves the right to revise or change product specifications at any time. This publication describes the state of the product at the time of publication and may not reflect the product at all times in the past or in the future.

Manufactured By:

The Compac Fillmaster and Fillmaster Ex is designed and manufactured by Compac Industries Limited
52 Walls Road, Penrose, Auckland 1061, New Zealand
P.O. Box 12-417, Penrose, Auckland 1641, New Zealand
Phone: + 64 9 579 2094
Fax: + 64 9 579 0635
Email: techsupport@compac.co.nz
www.compac.biz
Copyright ©2015 Compac Industries Limited, All Rights Reserved

Document Control

Document Information	
Document Details	Fillmaster Service Manual v.1.1.5
Current Revision Author(s)	T Watt
Authorised By	E Sione

Revision History

Version	Date	Author(s)	Revision Notes
1.0.0	08 Jun 2018	S Laycock	Initial document
1.0.1	09 Jul 2018	S Laycock	Added spare parts and updated terminal board wiring. Added modem LEDs
1.0.2	13 Jul 2018	S Laycock	Added new software options. Updated spare parts. Added dipswitch options.
1.0.3	24 Aug 2018	S Laycock	Updated wiring diagrams. Updated CompacOnsite.
1.0.4	08 Dec 2018	R Liu	Updated Contact Info
1.0.5	07 Feb 2019	R Liu	Updated Spare Parts
1.0.6	20 Feb 2019	R Liu	Updated Local Setup
1.0.7	23 April 2019	S Laycock	Corrected format and K-Factor wiring diagram
1.0.8	12 July 2019	S Laycock	Added software options
1.0.9	26 Feb 2020	V Amarakoon	Updated the Power supply diagram and the part number
1.1.0	17 June 2020	V Amarakoon	Updated the Software setup (new menu layout)
1.1.1	09 July 2020	V Amarakoon	Updated comms wiring and configuring slave display
1.1.2	10 July 2020	V Amarakoon	Updated Circuit boards
1.1.3	31 August 2020	V Amarakoon	Updated configuring Slave Displays
1.1.4	23 Jan 2023	T Watt	Added Compac/Dart/Gilbarco comms Added GPIO board
1.1.5	09 April 2025	T Wat	Updated error codes and EOS

Contents

Contents

Contents

Safety

PRECAUTIONS

Always follow safe operating procedures, any national or local regulations and site specific instructions.

Always turn the power off to the dispenser and properly isolate so power cannot be turned on by mistake.

Turn off isolating valves to the dispenser and drain the fuel before any mechanical servicing.

Electrical Safety

Observe the following electrical precautions:

Always turn off the power to the Compac C5000 processor before opening the flame proof box. Never touch wiring or components inside the high voltage area with the power on.

Always turn off the power to the Compac C5000 processor at the mains switch before removing or replacing software or memory ICs.

Always take basic anti-static precautions when working on the electronics, i.e., wearing a wristband with an earth strap.

Site Safety

Obey all company regulations and site specific instructions relating to the installation. Before working on any hydraulic equipment, drain the dispenser in an approved manner.

Static Electricity Precautions

Electronic components used are sensitive to static. Please take anti-static precautions.

All circuit boards must be carried and transported in static-shielded bags. An anti-static wrist strap should be worn and connected correctly when working on any electronic equipment. If an anti-static wrist strap is unavailable, or in an emergency, hold onto an earthed part of the pump/dispenser frame whilst working on the equipment. This is not a recommended alternative to wearing an anti-static wrist strap.

Compac Industries Limited reserves the right to refuse to accept any returned circuit boards if proper anti-static precautions have not been taken.

Installation

Do not commence installation without the specific installation instructions for your unit. Some information is duplicated here to help with reconfiguration and calibration after part replacement or software upgrading.

Note: The Fillmaster is available in two variants depending on the zone in which it is to be installed in:

FILLMASTER – This model is not approved for installation in a Hazardous area so does not have an Electrical Approval plate fitted

- In the FILLMASTER, the Modem is installed in a plastic enclosure in the Dispenser cabinet

FILLMASTER Ex – This model is approved for installation in a hazardous area and is fitted with an Electrical Approval plate.

- The FILLMASTER Ex has a separate cabinet on top of the Dispenser which houses the Modem.
- The PINPAd and Cardreader/HID/Mifare reader is also installed in this cabinet

Introduction

The Fillmaster is designed for safe, easy and trouble free dispensing of liquid fuel.

The Fillmaster has a built-in Fuel Management System

It can be configured with three different authorisation modes:

- HID reader - a third party authorisation system, which uses a customer carried RFID tag to authorise the transaction.
- Card reader - to authorise a transaction using the Card Reader system, the customer must swipe a magstripe card through the reader.
- PIN - When a dispenser/pump is set up for PIN code authorisation, the customer must enter a PIN.

The Fillmaster can use the built-in CompacOnsite Fuel Management System or connect to cloud-based CompacOnline

It is controlled by the Compac C5000 electronics which monitor all operating parameters to ensure correct metering and pricing. The C5000 electronics feature an easy to use, user friendly interface which allows quick set up from the dispenser. The Fillmaster stores transaction data in CompacOnsite, which allows easy management of sites and transactions.

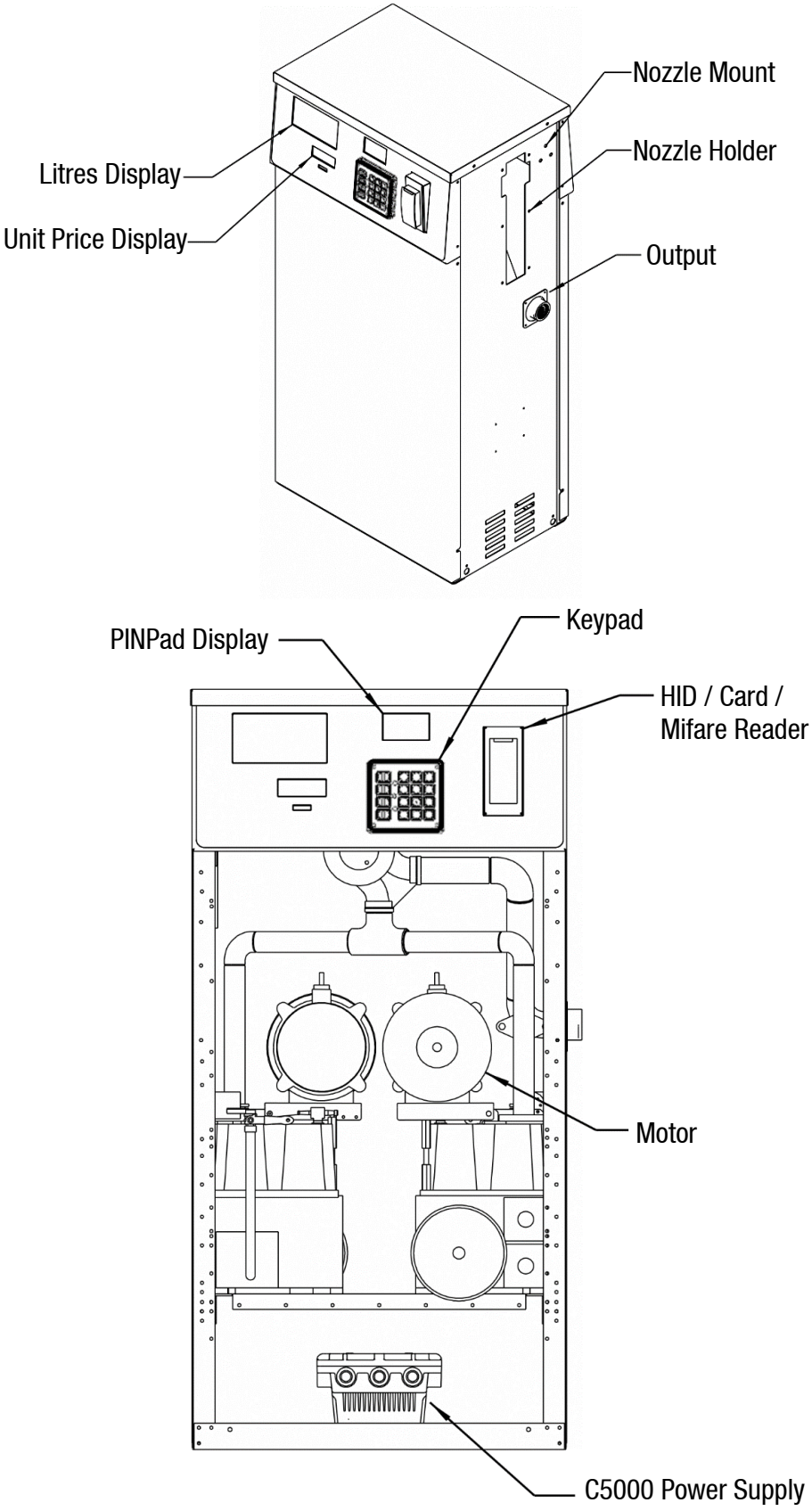
It can be configured with a Compac V50 or Compac COM50/COM125 meter for accurate and reliable measuring of dispensed liquid.

Principals of Operation

Liquid fuel is pumped from a tank or external fuel source. The fuel then passes through a filter, through a meter and out through the nozzle. The meter output is read by the C5000 and converted into litres and price, and sent to the display and built-in C5K Fillmaster Fuel Management System.

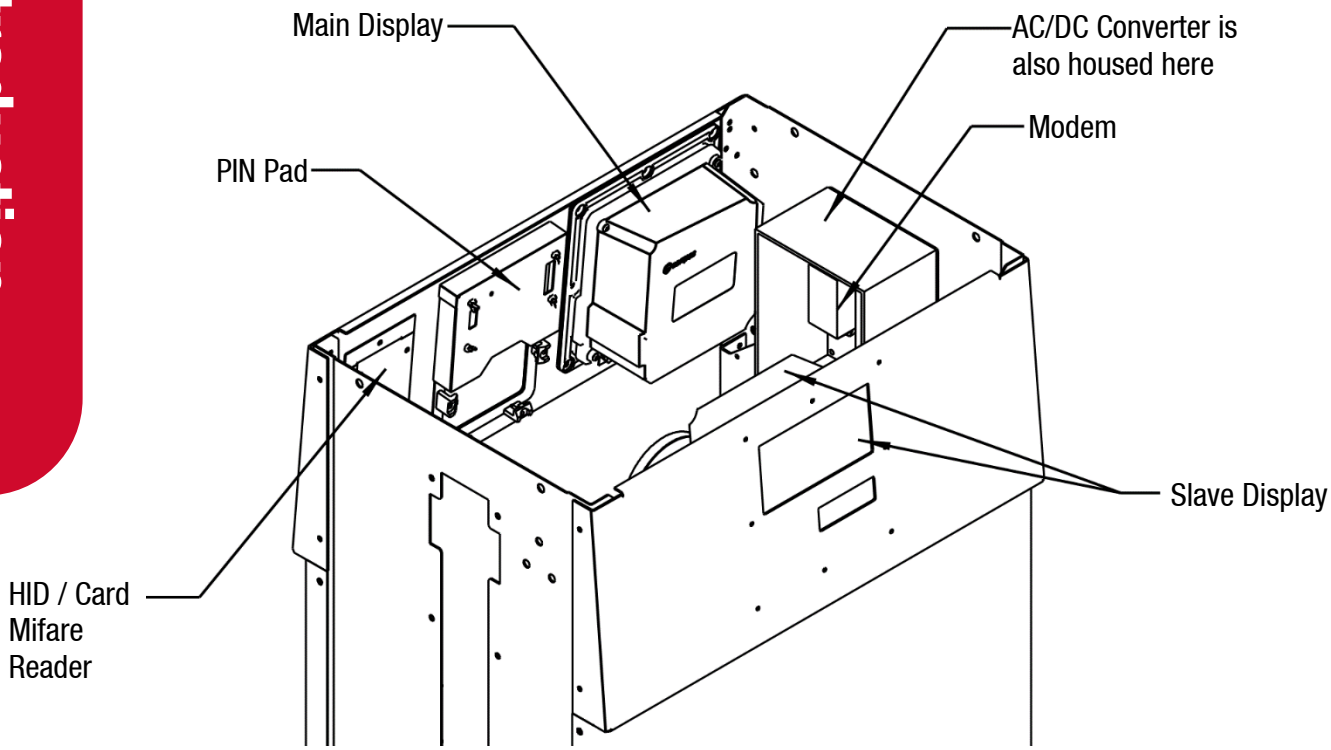
Layout (Non-Ex FillMASTER model shown)

The layout drawings shown are a guide only. Cardreader and PIN options are also available, so there may be a different option in place of the HID reader. Units can also be single or dual.

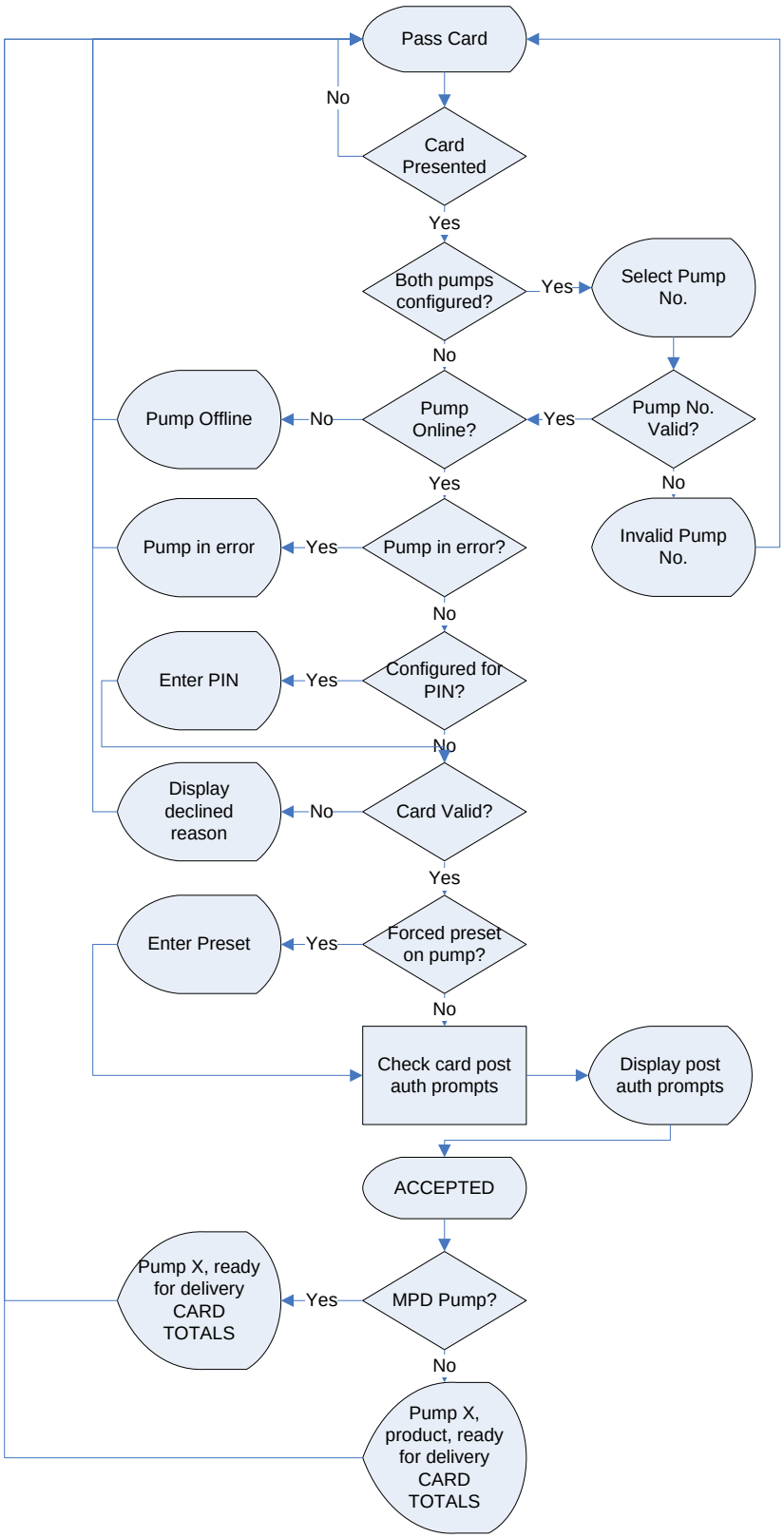


Electronics Layout

The following diagram shows the positions of some major electronic components of the Fillmaster. This view is from the back of the unit.



Typical Cycle



Software

This section details what options are available for the unit and what each setting means. Some settings may not be available for each specific unit.

System

Card Records

Before cards can be added, card records need to be set up from the Fillmaster. When setting up card records, a PAN length, BIN range, and access number can be specified. These are encoded onto the card and can be used to restrict access to the pumps. PAN length is the number of digits that make up the BIN number and card number. The BIN range gives access to a range of cards that have similar BIN numbers. BIN numbers are always 6 digits long. To make this into a BIN range, two numbers must be added. For example, if a card had the following card number:

7824331000132017

The card is 16 digits long, therefore the PAN length is 16.

The BIN number is 782433. To allow all cards with the same BIN number access:

BIN low should be set to 78243300.
BIN high should be set to 78243399.

This would allow all cards with a BIN number of 782433 access. The Access number is used to further restrict cards. This is a 5-digit number and will be encoded onto the cards. 0 should be entered into the Access field if the card does not have an access number. Once the card records are set up, specific cards can be entered into the system using PAN numbers.

If a card is hotlisted, it will be accepted even if the card PAN number has not been entered. Otherwise, the card's individual PAN number will have to be entered as a card. Prompts are an optional setting which may be chosen when setting card records. The prompts that are selected when entering a card will appear when that card is swiped; for example, if odometer is selected, the card holder will have to enter an odometer number to access the fuel pump. Cards can be enabled or disabled.

Passcode

For security, the unit has a passcode. This can be used to access settings from the unit. For extra security, if the settings are accessed with the passcode, some options are not able to be changed, such as the K-Factor setting. These must be accessed by pressing the K-Factor switch.

The unit supports three different authorisation modes: PIN, HID or Cardreader. The system can be set up from either CompacOnsite or from the unit itself.

NOTE: *If the unit is changed between Cardreader and HID configurations, it is important to change the dipswitch settings on the PIN pad board.* *See page 60.*

Pumps

The Fillmaster supports two configurations, single and dual, enabling two pumps to be used simultaneously if one card is used. These pumps are assigned a side so that they may be individually customised. Each side must be numbered between 1-99.

NOTE: *Entering a pump number 0 will disable the pump.*

Individual settings for each pump include the fuel product used, which has a name and product code, and the meter used at each pump. The unit supports encoder meters (max frequency 3.5Khz) or V50 meters. The K-Factor, used to calibrate fuel flow, can also be set for each pump. The state of the pumps can be either operational or locked, which may be desired if the pump is not operating normally.

Pumps have two solenoids for product flow. If the solenoids are unavailable, the pump preset should also be unavailable. Solenoid delay, the amount of time it takes the solenoids to turn on after lifting the nozzle, can be customised for each side. Auto authorisation can be enabled for a pump, allowing the pump to be authorised without lifting up the nozzle.

Preset Cutoff and Rounding

Preset cutoff is used to deliver an accurate amount of fuel. When dispensing fuel, two solenoids are used for fuel flow. When the dispensed amount of product reaches the preset cutoff, one solenoid is turned off to slow delivery rate and dispense an accurate volume of product.

A two-digit number can be assigned to determine the preset rounding in litres. The first digit determines how the preset is rounded down, and the second digit determines how the preset is rounded up. For example, if Preset Rounding is set to 89 and the preset is 40;

40.08 is within .08 of 40 and would therefore be rounded down to 40.

39.91 is within .09 of 40 and would therefore be rounded up to 40.

Flow Range and HI/Low Switch

A flow range is needed for each pump to dispense an accurate amount of product. If too much or too little fuel is dispensed, the meter can not accurately measure the dispensed fuel and therefore should cut off and display an end of sale message. The flow range will vary for different products. Flow low should be the lower value of the flow range, while Flow high is the highest possible flow.

NOTE: *Flow range is optional. The default value is 0.*

A flow timeout can be set, which cuts off the motor after the set amount of time. The default is 000, which is 20 seconds.

To increase flow during fuel deliveries, the Hi/Low switch should be turned on. This turns on the other motor during deliveries and therefore allows higher fuel flow.

Unit Price and End of Sale

The unit price is the price per litre of fuel dispensed. For this unit, it is displayed in the Card Totals window.

End of sale indicators show why the motor stopped during the last sale. Refer to End of Sale for the full list of these (see page 92.)

Cards and Card Users

Card numbers must be added for a card to be valid. Card or HID number can be added. These numbers should correlate to the earlier card setup done in the system section.

Cards can also have User IDs, which are optional prompts for cards. If a User ID is asked for the customer dispensing fuel will have to enter a valid User ID. If a user ID is not required, and instead the retailer wants a different prompt (such as Fleet number) user ID can be configured to ask for different prompts.

Meters

The unit supports encoder or V50 Modbus meters. The encoder meters can be single, dual or triple channel. Single channel encoders measure the fuel dispensed. Dual channel encoders do this as well as determine the rotation of the meter (and therefore the direction of fuel flow). Triple channel meters can determine if the meter is correctly connected and functioning.

K-Factor

The K-Factor is used to calibrate product flow. It is a ratio of litres dispensed per revolution of the meter. The K-Factor may need to be calibrated after periods of time. To calibrate the pump, dispense fuel into a certified measuring container and compare the display value with the one dispensed.

Example:

Display shows 10.00 True volume 20.00

To calculate the correct K-Factor from the information above; firstly record the existing K-Factor.

$$New\ K\ Factor = Existing\ K\ Factor * \frac{Dispensed\ Amount}{Displayed\ Amount}$$

$$= Existing\ K\ Factor * \frac{20}{10}$$

$$= Existing\ K\ Factor * 2$$

Unique ID is for a V50 meter only.

Minimum Measurable Quantity (MMQ)

Minimum measured quantity (MMQ) is the minimum delivery. The MMQ is calculated with the following equation:

$$MMQ = M\ x\ 10^{n}$$

With the value in litres. For example, if the coefficient was set to 2, and the exponent was set to 1:

$$MMQ = 2\ x\ 10^{1} = 20L$$

So the minimum delivery would be 20 litres.

The exponent can only be certain values;

- If the coefficient is 1, the exponent can be 0, 1, 2, 3 (valid values are then 1, 10, 100, 1000)
- If the coefficient is 2, the exponent can be 0, 1, 2 (valid values are then 2, 20, 200)
- If the coefficient is 5, the exponent can be 0, 1, 2 (valid values are then 5, 50, 500)

If either of the values entered are not valid, or the value is left as 00, the MMQ will be calculated from the maximum flow. The MMQ is the maximum flow x 0.05. For example, if the maximum flow was 40 (the default):

$$MMQ = 40\ x\ 0.05 = 2L$$

Note that the MMQ still must be one of the valid values listed above. If the MMQ is calculated from the maximum flow, and is NOT one of the valid values listed above, it will be rounded up to the next valid value. For example, if the maximum flow was 600:

$$MMQ = 600\ x\ 0.05 = 30L$$

30L is not a valid value, and therefore the MMQ would be rounded up to 50L.

Quantity Setting

This setting is what quantity will be shown on the main display when fuel is being dispensed. This is only valid for V50 meters and is ignored for encoder meters which always display Litres uncompensated.

Tanks

Tanks can be set up with their corresponding product, number and capacity.

Tank Gauging

Tank gauging is used to determine how much fuel is left in a tank. The Filmaster supports four tank gauges; Veeder-Root, Fafnir, Vega and Virtual. To accurately gauge the volume of fuel, the tank number, safe fill level and capacity are required. These depend on the tanks onsite. If a Vega electronic dipstick is used, please note that more information will be required; the position of the probe in the tank is needed. A Tank Strapping table ID will be required to calculate

volume. A Vega electronic dipstick may also be connected differently; the gauge channel may change depending on the connection to the Comms board.

Device

As the C5000 electronics are used for a variety of units, the variant can be changed. For the Fillmaster, there are three options for variant:

- Retail
- Commercial 1
- Commercial 2

These will show different units on the main display. The main display has two rows (depending on the unit.)

The Retail display will display the price in the top row and the litres in the bottom row, while showing the unit price in the Card Totals display. This should be used on retail sites.

The Commercial 1 setting will only have one row, which will show litres for side A. Card totals will be displayed in the Card Totals display. This should be used on commercial units with only one side operable.

The Commercial 2 setting will display litres for side A in the top row, litres for side B in the bottom row, and card totals in the Card Totals display. This should be used on commercial units with both side A and side B.
If you only want to use one side of the unit, simply disable the side you do not want to use.

The slave display, located on the back of the unit, can have three configurations.

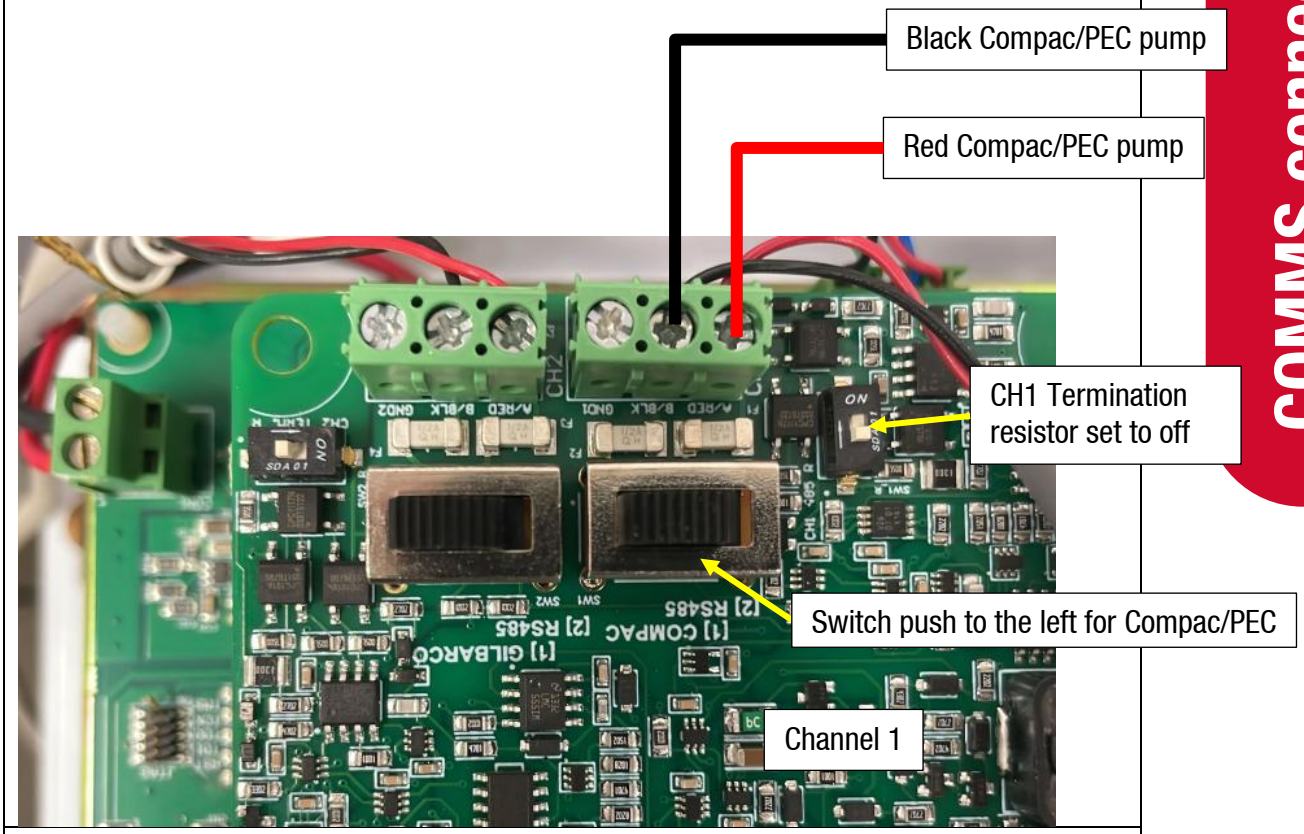
- None – this setting will display nothing on the slave display.
- Clone – this setting will display a clone of the main display.
- Side B – this setting will display the side B output.

To update the software, contact Compac.

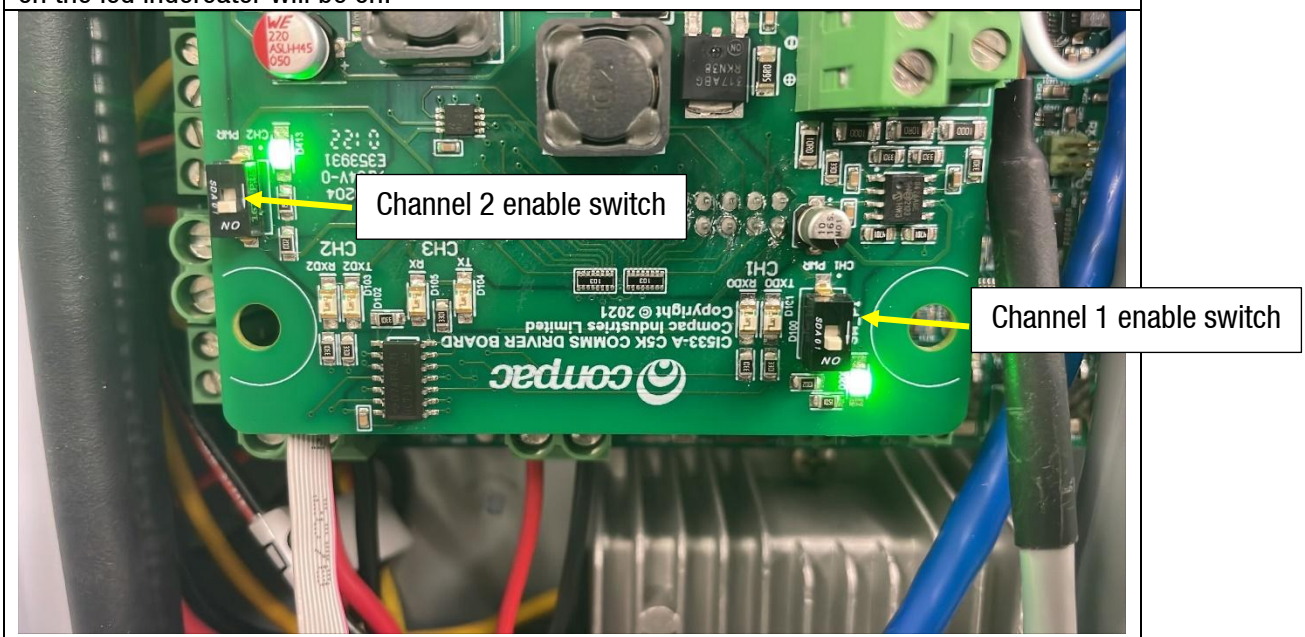
COMMS connections

Compac/PEC setup on the C5000

The following is the connections and switch setting for Compac/PEC on the CI533A. Note that Channel 2 is free to be used as Gilbarco or Dart

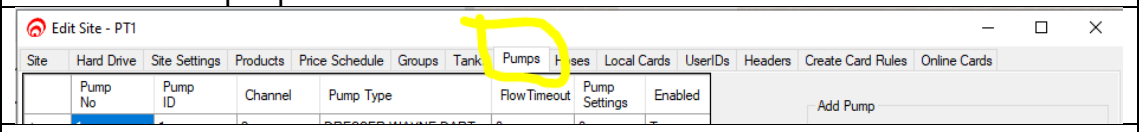


Also need to make sure the the Channel that you are using is switch on. When the channel is on the led indercater will be on.



Configuration / Setup

To set up pumps talking Gilbarco right click on the Site and the click on edit site.
Then click on the pumps tab



Setup the pump

Pump number: The number of the pump that you will select when prompted

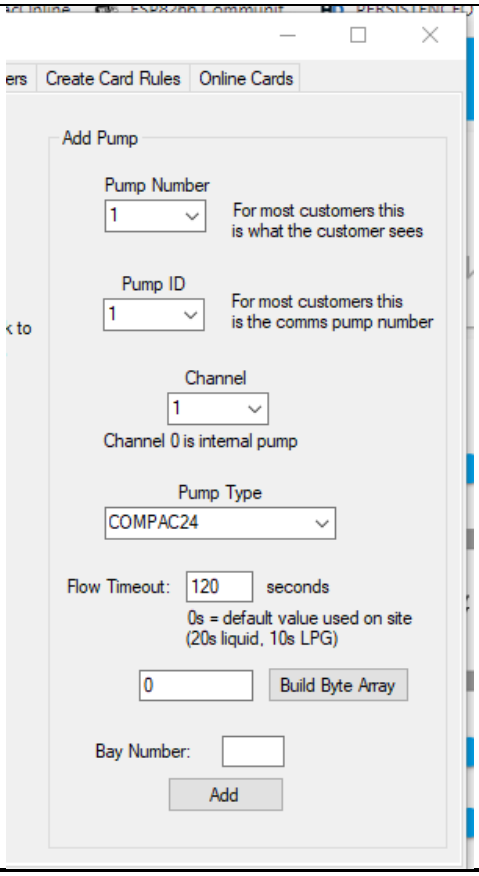
Pump ID: This is the ID set in the pump (normally set the same as the pump number)

Channel: Compac/PEC is always on Channel 1

Pump Type: Set the Pump type “Compac12 ”,“Compac24”, “PEC12” and “PEC12_6digit” Depending on what the Dispenser is set to

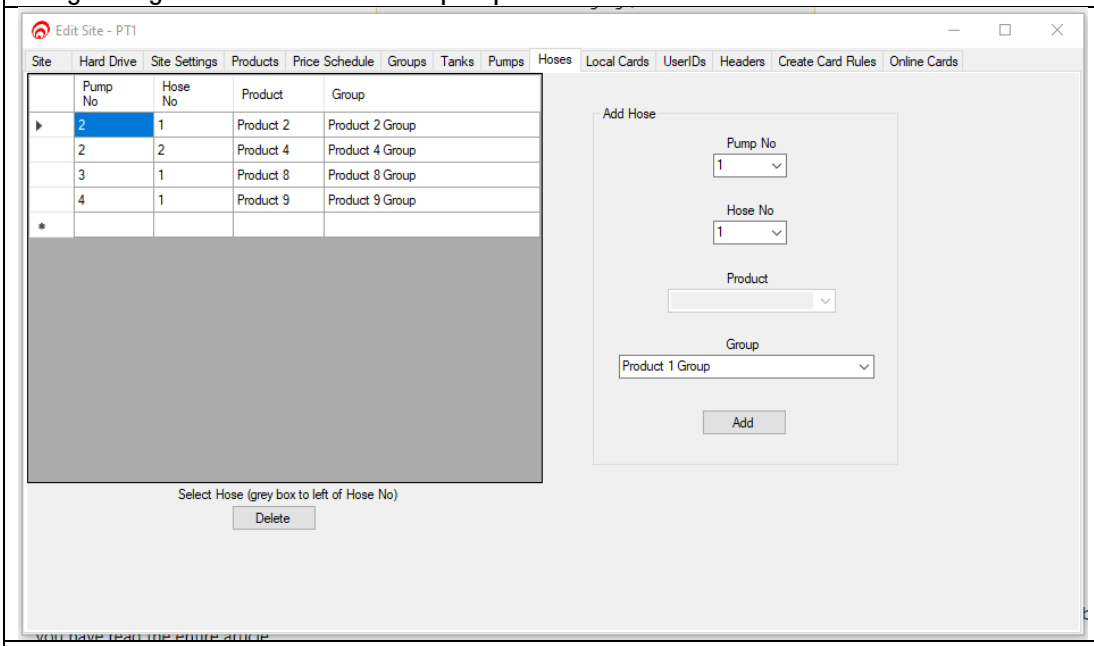
Flow timeout: This is the time in seconds after the C5000 says “Ready for delivery” before the c5000 times out and cannels the authorisation

Then click the “Add” button

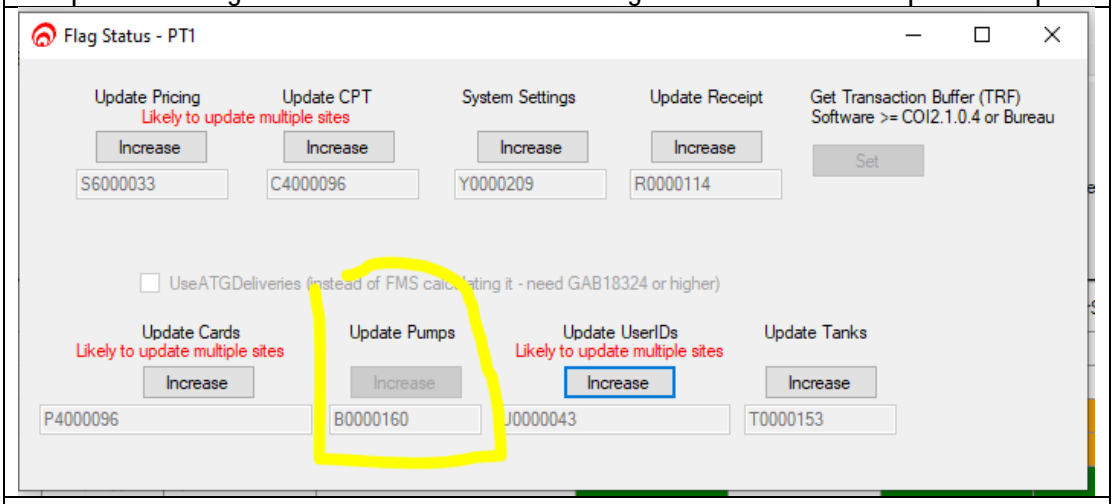


Setup the Hoses

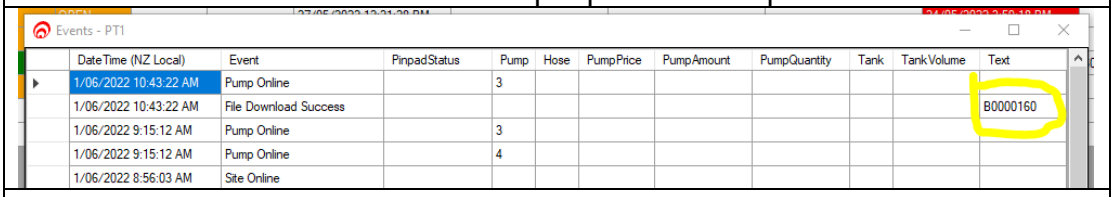
Assign the grades the hoses on the pump



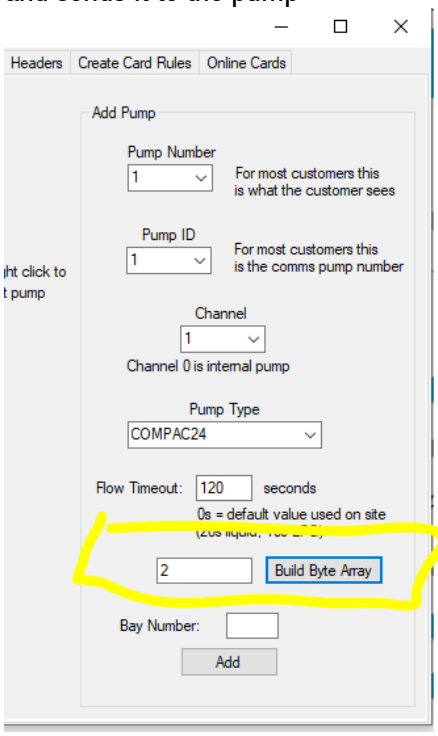
After the pump is setup in the admin tool yoy have to flag the site it update the pump Setup.to do this right click on the site and click “Flag status”. Then click “Update Pumps”

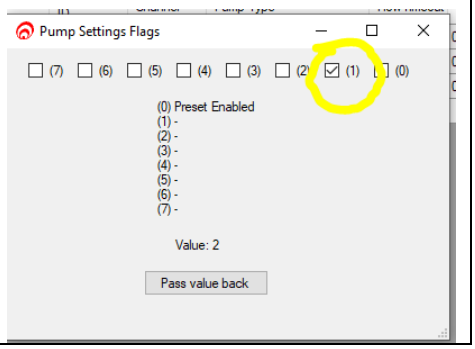


You then can check the events to see if the pumps have been updated



Extra Compac/PEC settings

<table>
<tr><td colspan="2">There are some pumps that need specific settings. Below is the symptom and the pump type to use. If you are changing a setting to MUST reset the C5000 after making the change</td></tr>
<tr><td>Symptom</td><td>Setting to use</td></tr>
<tr><td>The Dispenser seems to keep trying to price change or the price is displayed as $4.123 and it should be $1.234</td><td>If PEC12 change to Compac12 and if Compac12 change to PEC12</td></tr>
<tr><td>Compac dispenser. when you enter the auth $10 the pump is stopping at 10 litres. This is the because some compac dispensers only do litres preset</td><td>Add the setting below this makes the C5000 work out the litres equivalent and sends it to the pump
 

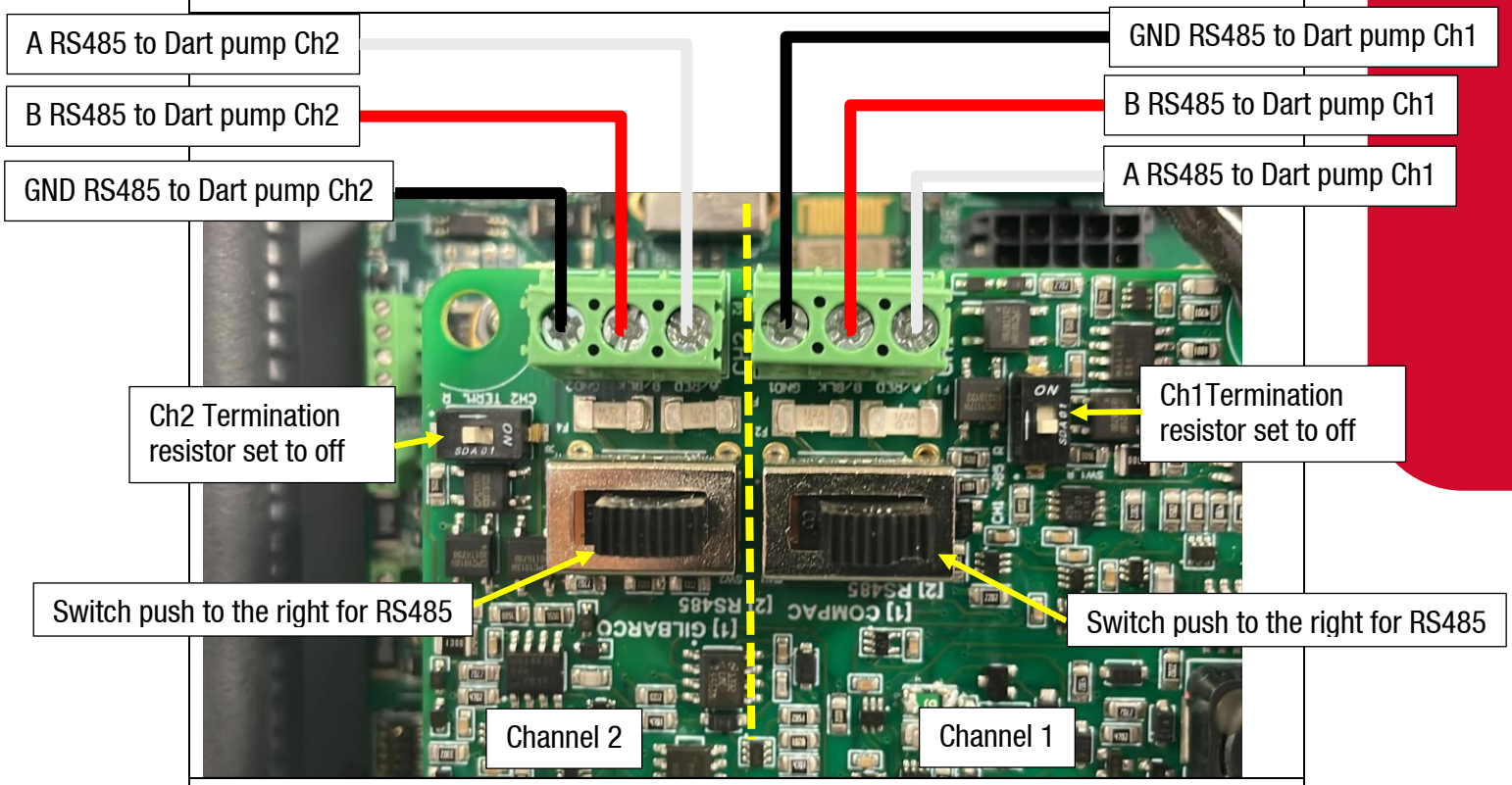

</td></tr>
</table>

Dart setup on the C5000

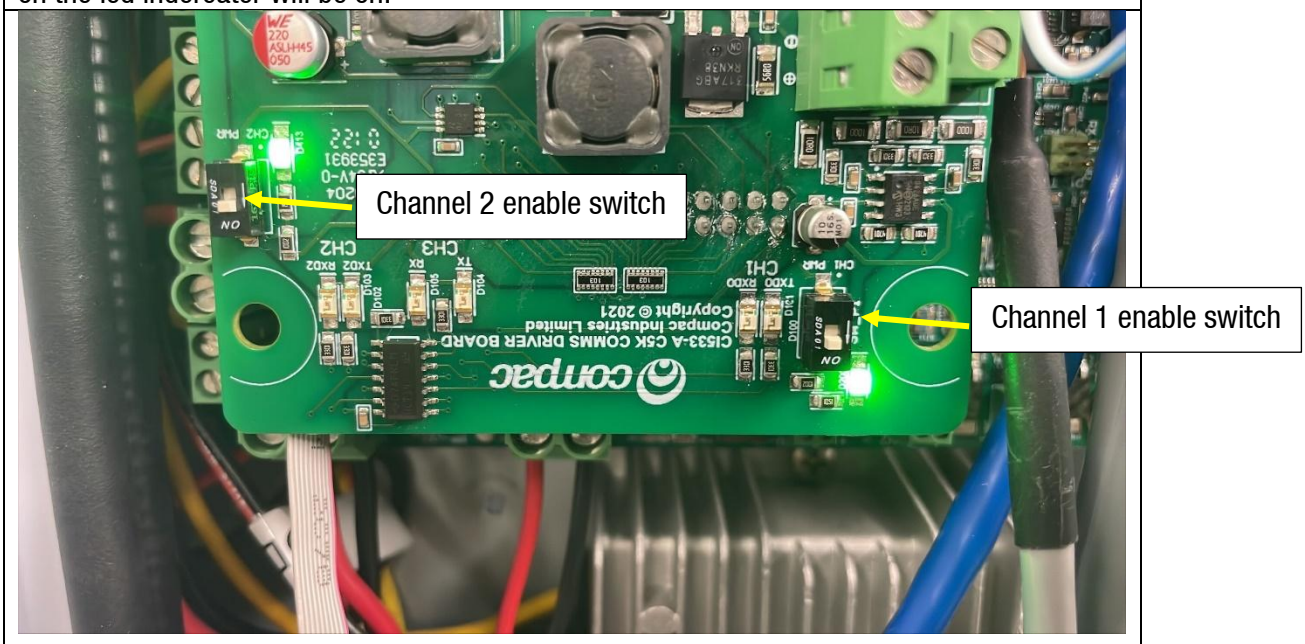
Connections

Normal text

The following is the connections and switch setting for Dart on the CI533A Ch1 and Ch2

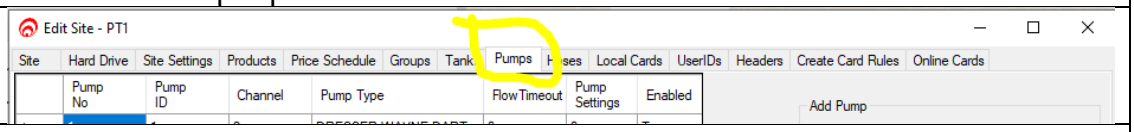


Also need to make sure the the Channel that you are using is switch on. When the channel is on the led indercater will be on.



Configuration / Setup

To set up pumps talking Dart right click on the Site and the click on edit site.
Then click on the pumps tab



Setup the pump

Pump number: The number of the pump that you will select when prompted

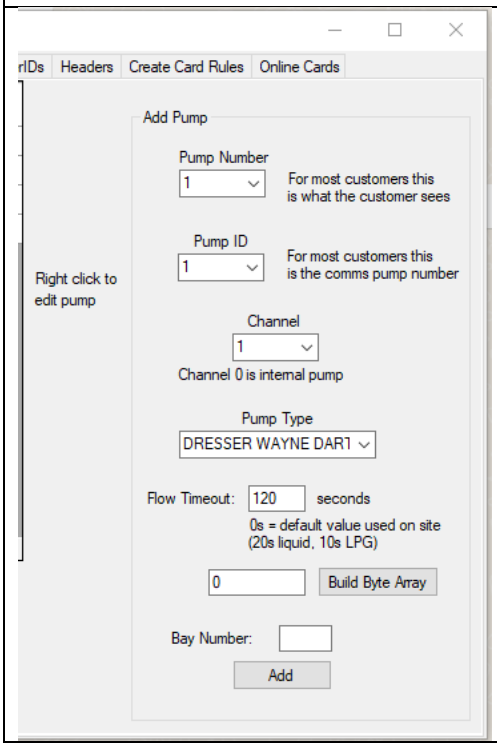
Pump ID: This is the ID set in the pump (normally set the same as the pump number)

Channel: The Channel that the pumps are connected to on the CI533 see above

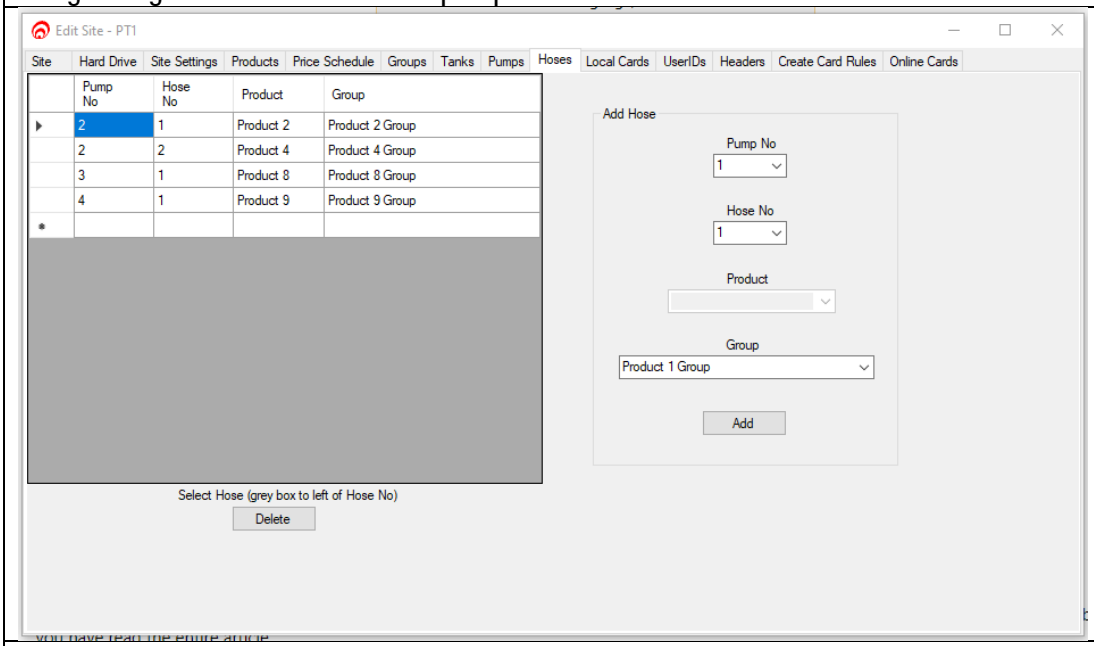
Pump Type: set the Pump type “DRESSER WAYNE DART”

Flow timeout: This is the time in seconds after the C5000 says “Ready for delivery” before the c5000 times out and cannels the authorisation

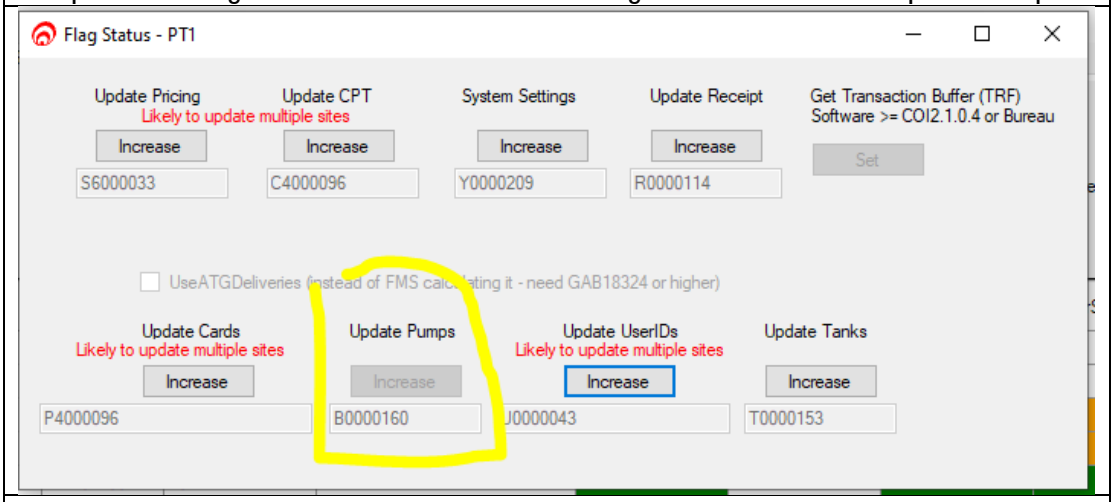
Then click the “Add” button



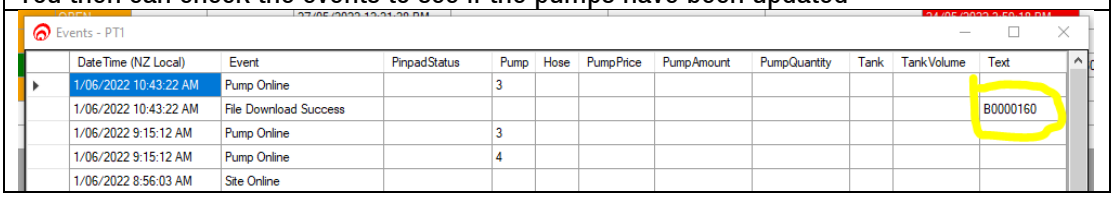
Setup the Hoses
Assign the grades the hoses on the pump



After the pump is setup in the admin tool yoy have to flag the site it update the pump Setup.to do this right click on the site and click “Flag status”. Then click “Update Pumps”



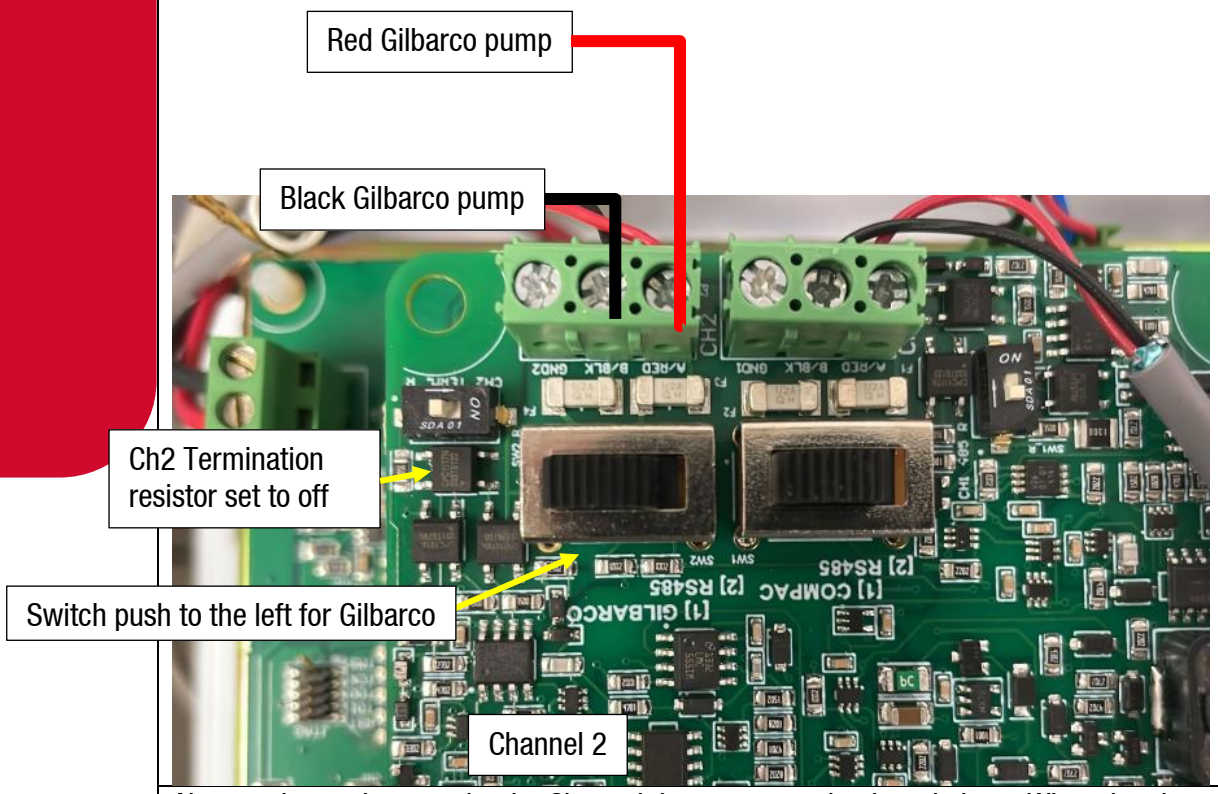
You then can check the events to see if the pumps have been updated



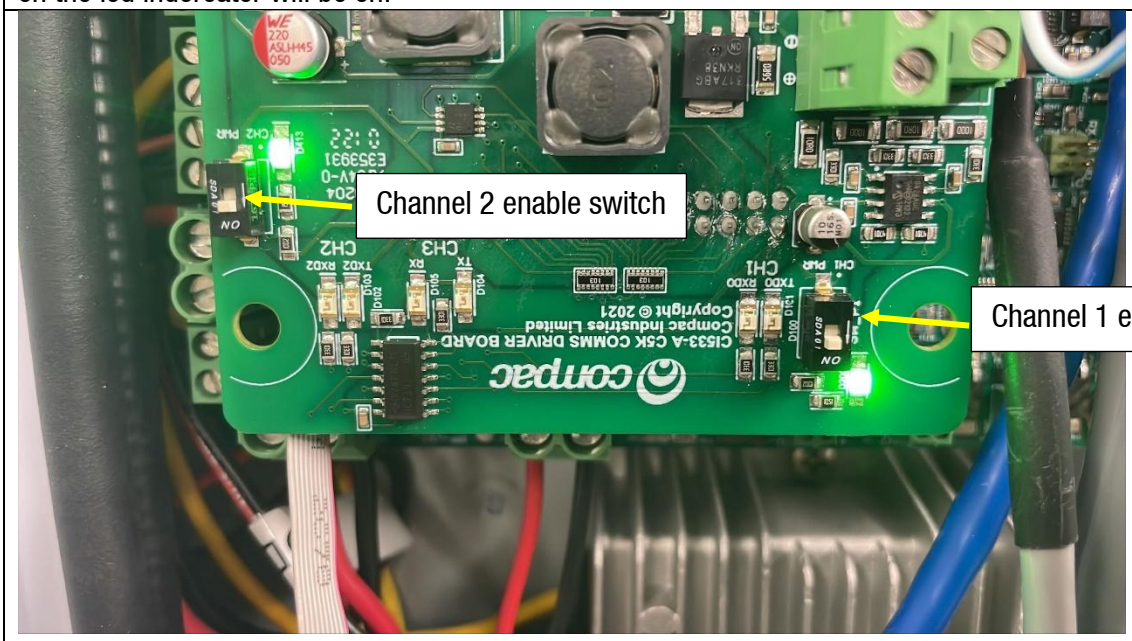
Gilbarco setup on the C5000

Connections

The following is the connections and switch setting for Gilbarco on the CI533A. Note that Channel 1 is free to be used as Compac or Dart

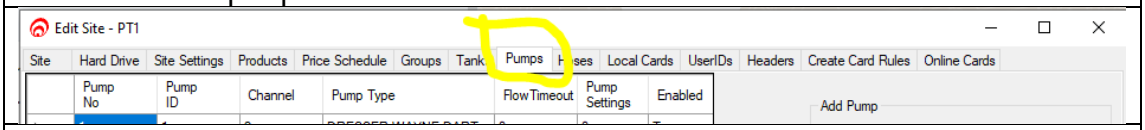


Also need to make sure the the Channel that you are using is switch on. When the channel is on the led indercater will be on.



Configuration / Setup

To set up pumps talking Gilbarco right click on the Site and the click on edit site.
Then click on the pumps tab



Setup the pump

Pump number: The number of the pump that you will select when prompted

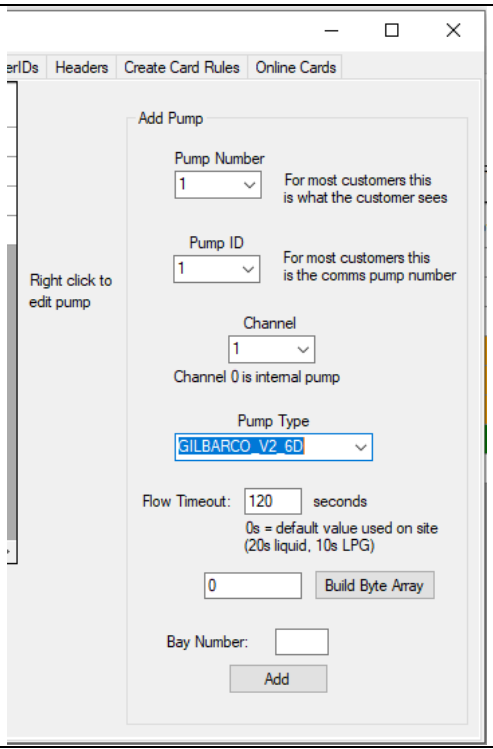
Pump ID: This is the ID set in the pump (normally set the same as the pump number)

Channel: Gilbarco is always on Channel 2

Pump Type: Set the Pump type “GILBARCO_V2_6D” or “GILBARCO_V2_5D” Depending on what the Dispenser is set to

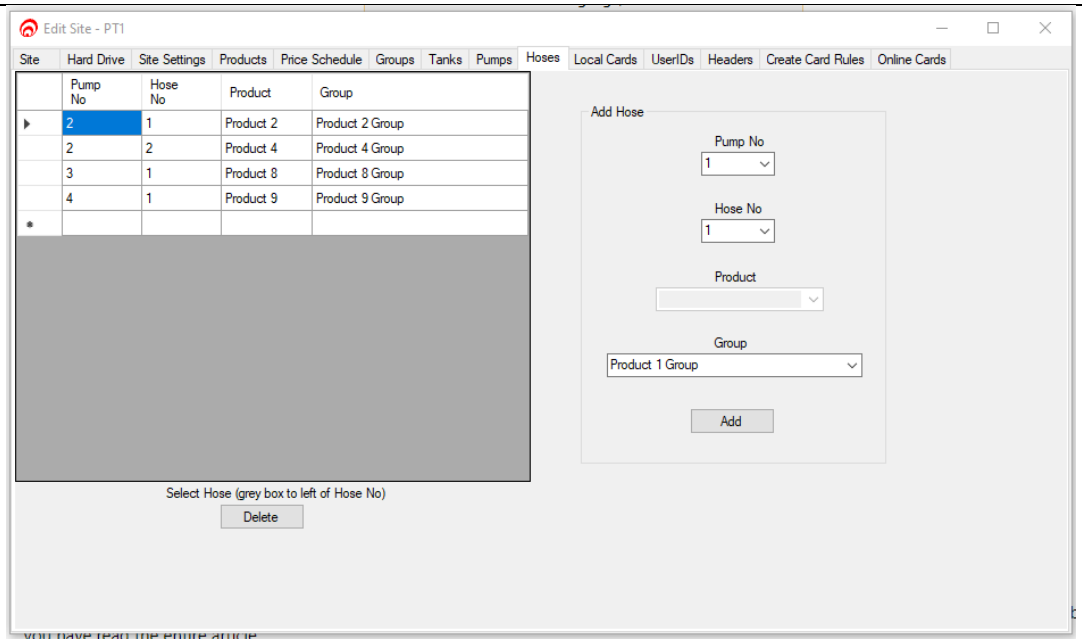
Flow timeout: This is the time in seconds after the C5000 says “Ready for delivery” before the c5000 times out and cannels the authorisation

Then click the “Add” button



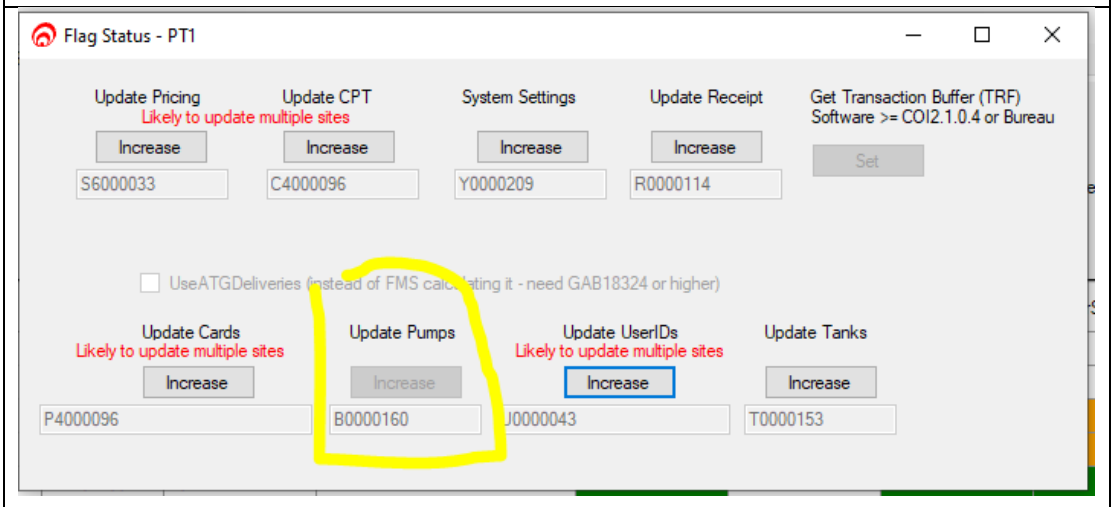
Setup the Hoses

Assign the grades the hoses on the pump

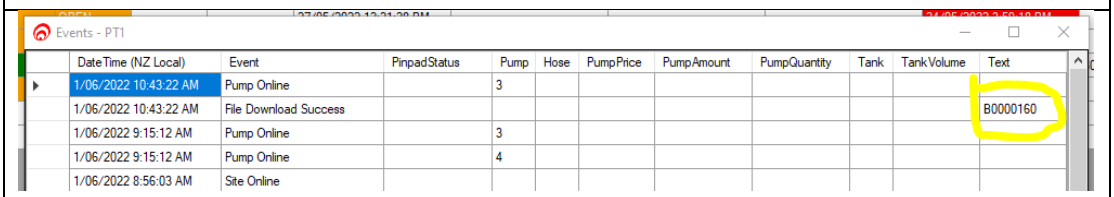


After the pump is setup in the admin tool yoy have to flag the site it update the pump

Setup.to do this right click on the site and click “Flag status”. Then click “Update Pumps”



You then can check the events to see if the pumps have been updated

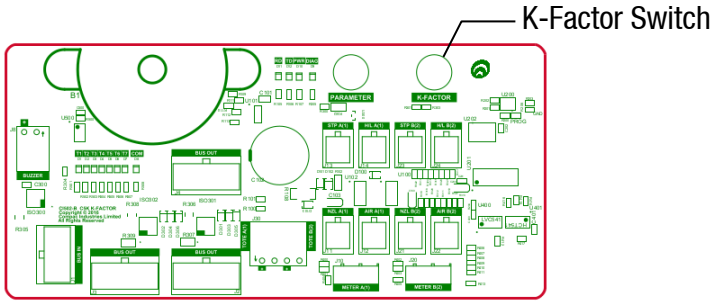


Extra Gilbarco settings

The C5000 is setup to automatically set the correct Gilbarco protocol. But sometimes the dispenser is a little different. In these cases, we have special Gilbarco protocol versions. GILBARCO_V2_5D_Preset2D GILBARCO_V2_5D_Preset4D GILBARCO_V2_6D_Preset2D GILBARCO_V2_6D_Preset4D GILBARCO_V1_5D_Preset2D GILBARCO_V1_5D_Preset4D GILBARCO_V1_6D_Preset2D GILBARCO_V1_6D_Preset4D
Compac Pumps Running Gilbarco need to be set to “GILBARCO_V1_5D_Preset2D” or “GILBARCO_V1_6D_Preset2D”

Software Setup

To change settings from the unit you must either have access to the K-Factor switch, which is located on the inside of the unit on the K-Factor board or have the passcode to the unit.



Pressing the K-Factor switch will bring up a menu displaying set up options on the Keypad display. The available options are shown below. The same menu can be accessed by pressing Cancel on the standard display and entering the passcode.

MENU

1.SYSTEM
2.HARDWARE
3.PUMPS
4.AUTH
5.PRODUCTS
6.TANKS

IMPORTANT NOTE: The settings shown on each individual unit will depend on the current software version. Not all the options shown here may be displayed on every unit.

NOTE: *If the menu is accessed by entering the passcode, not all the settings will be available. K-Factor and meter setup can only be accessed by pressing the K-Factor switch.*

The K-Factor switch must be sealed after servicing.

NOTE: *The system has a timeout of 15 seconds.*

1. System

SYSTEM

1.DEVICE
2.PASSCODE
3.NETWORK
4.TIME
5.INFO

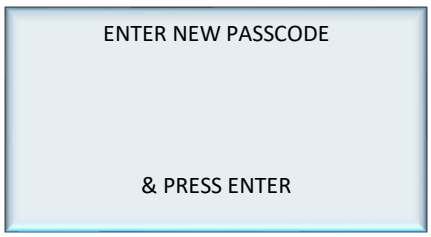
Device

To Access this menu, select SYSTEM from the main menu and then select DEVICE. Only change the device ID if the processor board is replaced.

To change the device ID,

1. From here the device ID and CompacOnsite login can be viewed
2. To change the Device ID, press #
3. Enter the new device ID and press enter

Passcode



To Access this menu, select SYSTEM from the main menu and then select PASSCODE. To change the Passcode,

1. From System, select Passcode
2. Enter the desired new passcode and press enter

Network

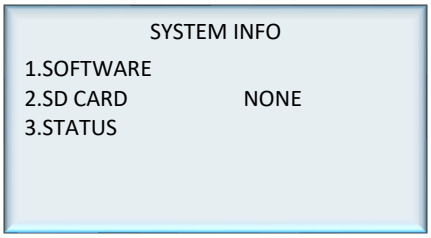
To Access this menu, select SYSTEM from the main menu and then select NETWORK. The IP address, subnet, gateway and DNS settings of the unit can be viewed or changed. Select the desired setting to be changed .Enter the new values and press enter.

Time

Select SYSTEM from the main menu and then select TIME from the system menu.

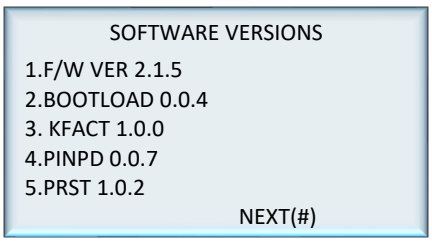
1. To change the time and date, select the option and enter the new time or date.
2. To change the time zone, press 3 and select the desired time zone.
3. The offset is set by the time zone.
4. Select DST to “yes” or “no” for daylight saving.

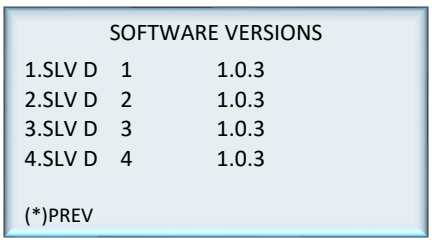
Info



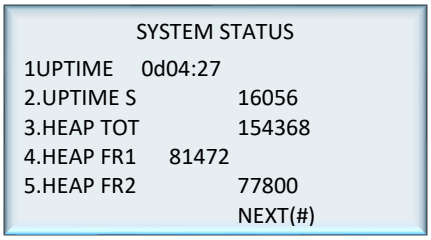
To access Info, select SYSTEM from the main menu and then select INFO. The information section is read only.

1. Selecting Software will show the software versions loaded.

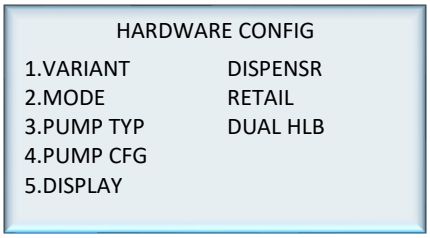




2. Select status to see the system uptime.

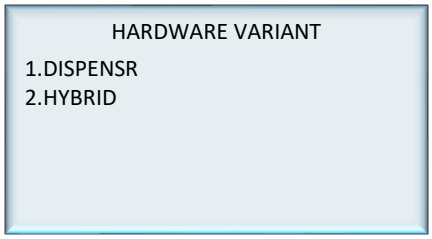


2. Hardware



This menu is available from the main menu. Select HARDWARE. Variant, mode, pump type, stop switch and display settings are available in Hardware configurations. The following section will explain how to configure hardware.

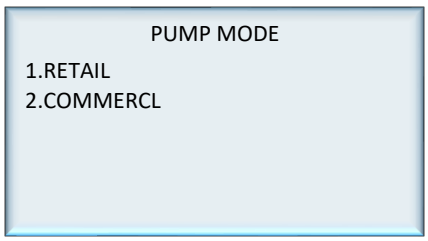
Variant



Select HARDWARE from the main menu and then select VARIANT. To change variant,

1. Press 1 to enter the variant from Hardware config menu.
2. Chose the appropriate number to set the variant as a dispenser or a hybrid(controller and a dispenser). This will rarely need to be changed.

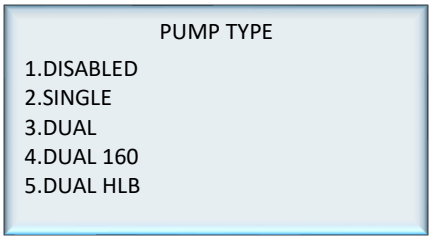
Mode



Select HARDWARE from the main menu and then select MODE.

The pump mode is a restricted menu and can only be accessed with the K-Factor switch. The pump mode can be changed by selecting the desired setting.

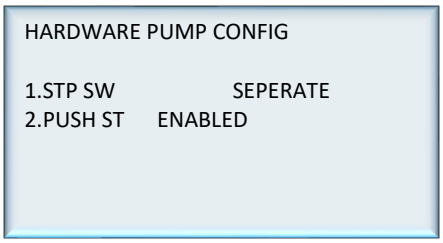
Pump Type



Select HARDWARE from the main menu and then select PUMP TYP.

Pump type is a restricted menu and can only be accessed with the K-Factor switch. Pump type can be changed by selecting the desired setting.

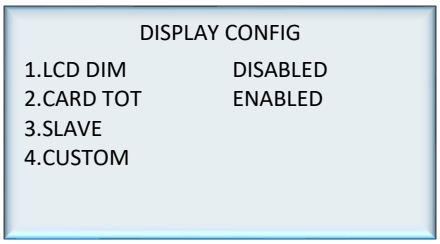
Pump Config



Select HARDWARE from the main menu and then select PUMP CFG.

1. It's a restricted option and can only be accessed by pressing the K-Factor switch.
2. STP SW is for sump stop switch. Stop switch can be changed between separate and combined
3. PUSH ST is for push start button this option can be toggled between enabled and disabled.

Display

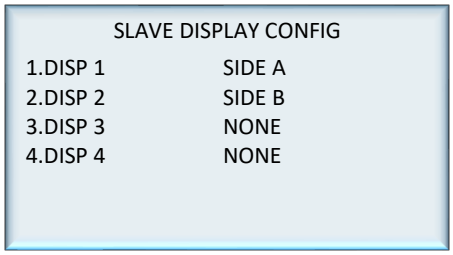


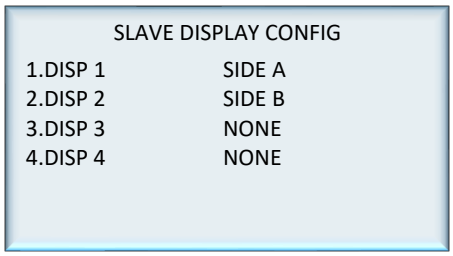
Select HARDWARE from the main menu and then select DISPLAY.

To change the settings,

1. Select LCD dimming or card totals to enable or disable these functions.
2. Slave display settings or custom display information can be accessed by selecting the desired option.

Slave Display





Select HARDWARE from the main menu, select DISPLAY and then select SLAVE from the display config menu.

Each connected slave display can be configured from this menu. Select the slave display to assign it to the appropriate side.

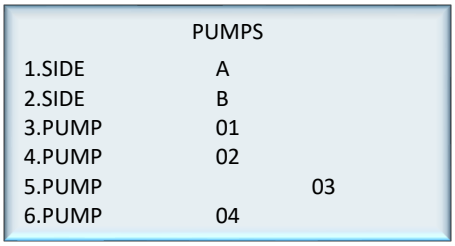
Custom

Select HARDWARE from the main menu, select DISPLAY and then select CUSTOM.
To change settings,

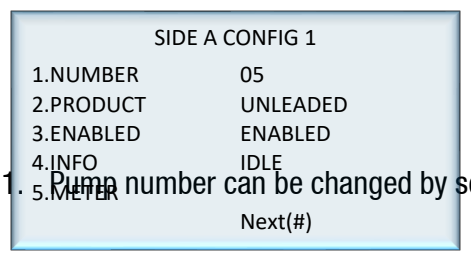
1. Select the desired functionality to toggle it between enabled and disabled.
2. Enable extra to display extra information during a transaction.

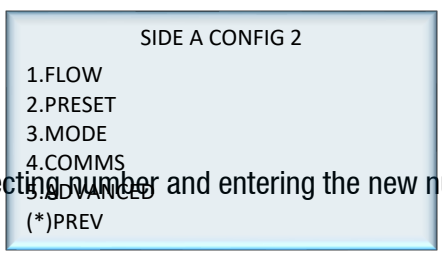
3. Pumps

Select PUMPS from the main menu.



Only side A and side B are available in dispenser mode. More pumps are available in hybrid mode. Select a pump to configure.





1. Pump number can be changed by selecting number and entering the new number.

2. Products can be assigned to hoses by pressing 2 and selecting from the list of products.

SET HOSE PRODUCT		
1.H1	PROD	LPG
2.H2	PROD	UNLEADED
3.H3	PROD	95
4.H4	PROD	AVGAS
5.H5	PROD	DIESEL
		Next(#)

SELECT HOSE PRODUCT	
1.PRD	#01 UNLEADED
2.PRD	#02 DIESEL
3.PRD	#03 95
4.PRD	#04 AVGAS
5.PRD	#04 LPG
(*)PREV	

3. The pump can be toggled between enabled and disabled by selecting enabled.
4. Info is read only and indicates the status of the pump.

PUMP 03 INFO	
1.IF STATE	INOPER
2.END SALE	FMS TEM
3.TOTALS	
4.MMQ USED	00000002
(*)PREV	

Meter

Select PUMPS from the main menu and select METER will bring up the following menu.

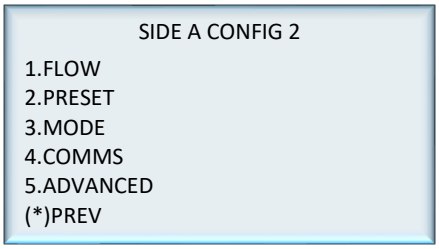
SIDE A METER CONFIG	
1.TYPE	3CH ENC
2.K FACTOR	005.0000
3.UNIQ ID	N/A
4.CALIB	DISABLED

1. The meter type can be chosen from given types.

METER TYPE
1.DISABLED
2.1CH ENC
3.2CH ENC
4.3CH ENC
5.MODBUS

2. K-Factor can be set to a desired value.
3. Unique ID is for V50 and other Modbus meters only and can be ignored for other meter types.
4. Calibration mode can be enabled or disabled by pressing 4.

These settings (SIDE A CONFIG 2) will be available after pressing # from the PUMPS menu



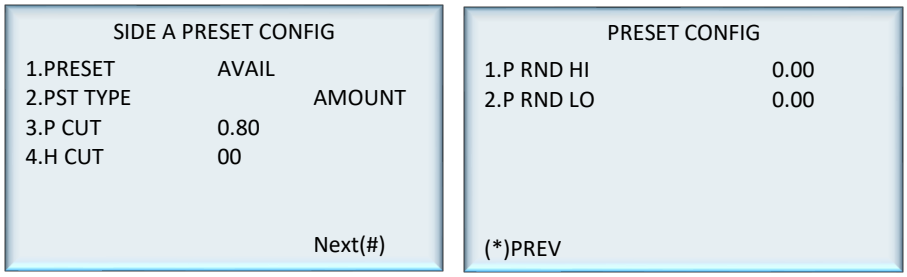
Flow

Select PUMPS from the main menu and press # to go to the next page. Select FLOW

Each flow setting can be changed by selecting the setting and entering the new value. These settings are flow timeout, solenoid delay, high- and low-flow cut-off, and maximum flow (Qmax).

Preset

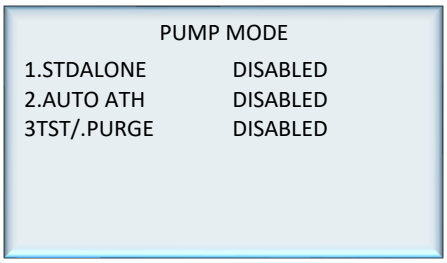
Select PUMPS from the main menu and press # to go to the next page. Select PRESET.



1. Preset can be toggled between available and unavailable by pressing 1.
2. Preset type can be toggled between amount and price by pressing 2.
3. Preset high, preset low, and preset rounding high and low (on the next screen) can be changed by selecting the functionality and entering the new value.

Pump mode

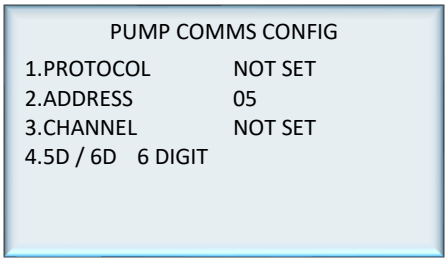
Select PUMPS from the main menu and press # to go to the next page. Select PUMP MODE.



Standalone mode, auto authorisation mode, and purge mode can be toggled between enabled and disabled by selecting the functionality

Comms

Select PUMPS from the main menu and press # to go to the next page. Select COMMS.



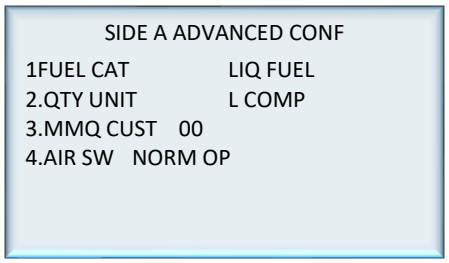
1. The communications protocol can be set to Compac, PEC, or Gilbarco.
2. Select channel 1 or channel 2 to match with the comms board channel.
3. The address can be set by entering a desired number. Usually pump number and address will be the same.

The display can be toggled between 5 and 6 digits by pressing 4.

Advanced

Select PUMPS from the main menu and press # to go to the next page. Select ADVANCED.

1. Fuel category can be changed between Liquid Fuel , Diesel EF and LPG
2. Quantity unit can be changed between litres compensated and litres uncompensated
3. A valid Minimum measurable quantity can be entered into this field to change the default value
4. Air switch operation can be toggled between normally open and normally closed.



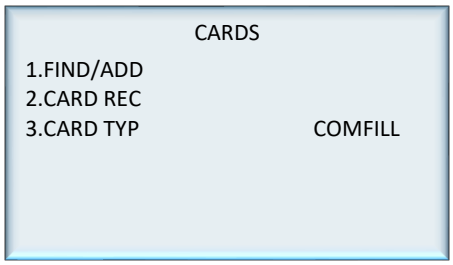
4. Auth (Only available in hybrid mode)

Select AUTH from the main menu.

In Auth settings, cards, card user, authorisation mode and authorisation time out can be changed following section will explain how to configure each setting.

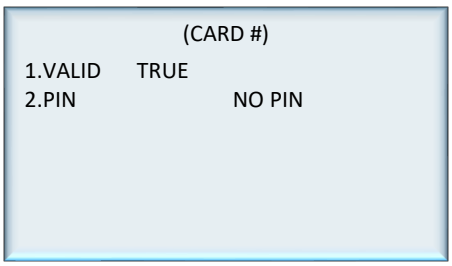
4.1.Cards

Select AUTH from the main menu and select CARDS.

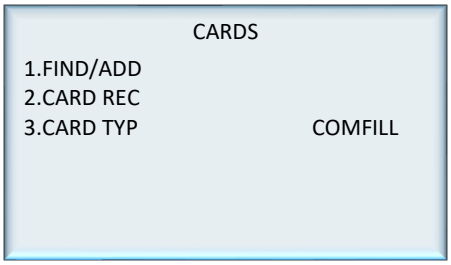


To add or change a card,

1. From Cards, select Find/Add
2. Enter a new card or an existing one
3. Alternatively, swipe the card or HID tag to automatically enter the card number
4. If a card number was entered, press enter to confirm entry
5. To make the card valid select valid and toggle between true and false
6. To set a new PIN, select PIN and enter the desired PIN



Card Type



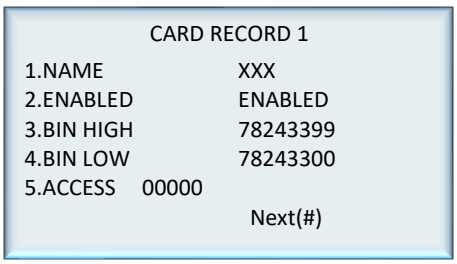
Select AUTH from the main menu and select CARDS and then select CARD TYP.

Card type can be toggled between comfil and comfill s.

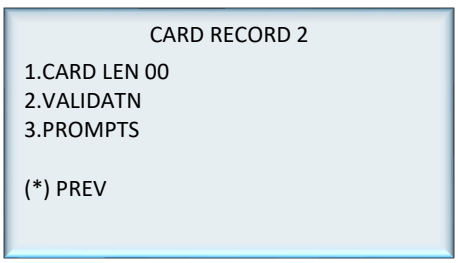
If desired, the card type can be changed to 'Short Comfill'. This setting allows 1200 cards to be recorded, as opposed to 300. If this setting is implemented, only one owner detail can be saved to each card. To change this, press 1 and select the required card type.

Card record

To access card record, select AUTH from the main menu, select CARDS and then select CARD RECORD. Select the desired number to setup a new Card record.



1. Press 1 to name the card record.
2. Pressing 2 will let to enable or disable the card record.
3. Enter appropriate bin high / bin low values and access number.
4. Press # to proceed to next window.



1. Press1 to Set the length of the PAN (card number).
2. Press 2 to set Validation.

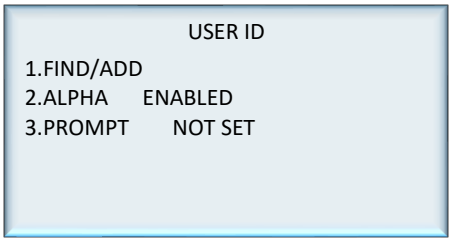
Validation

1. Enable hot list to accept all cards within bin low and bin high range.
2. Press 2 to enable or disable card expiry date.

Prompts

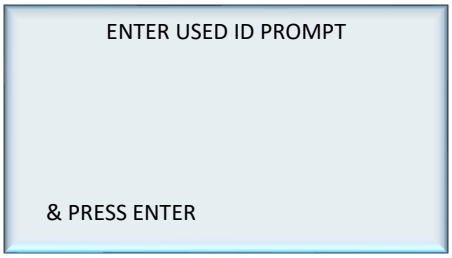
Use this menu to enable or disable prompts in authorization mode.

4.2. Card User



To access card user, select auth from the main menu, and then select card user from the auth config menu.

1. User IDs can be found or added by pressing 1 and entering a user ID.
2. Alphanumerical characters can be enabled or disabled by pressing 2.
3. Prompts can be added by pressing 3 and entering the desired prompt

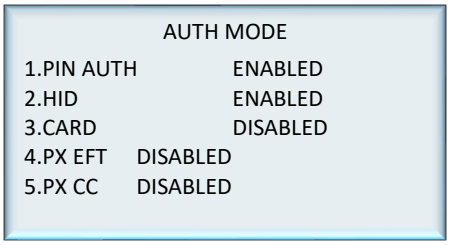


To edit and change user IDs,

1. From Card User, select Find/Add
2. Enter either a new user ID or an existing one
3. If a new user ID was entered, press Enter to confirm entry
4. The user ID can now be changed from valid to invalid and vice versa

4.3.Auth Mode

To access auth mode, select AUTH from the main menu, select AUTH MODE.



The unit can support HID Readers, PIN, and Cardreaders. To set or change the configuration:

1. From System, select Auth Mode
2. Enable or disable the desired configuration. Pressing the number corresponding to a configuration will change it from enabled to disabled and vice versa
3. Eftpos and credit card authorisation should be disabled for this application.

NOTE: *If the unit is changed between Cardreader and HID configurations, it is important to change the dipswitch settings on the PIN pad board. See page*

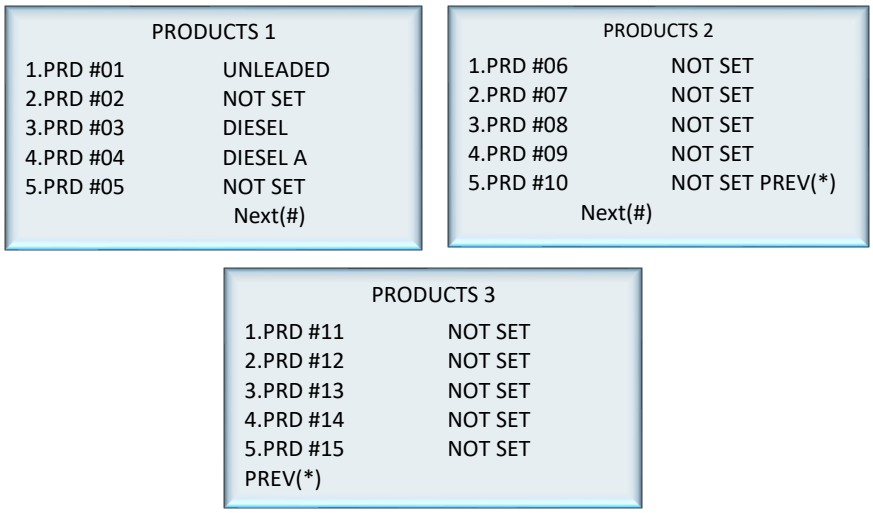
4.4. Auth Time Out

To access auth time out, select AUTH from the main menu, select ATH T/O.

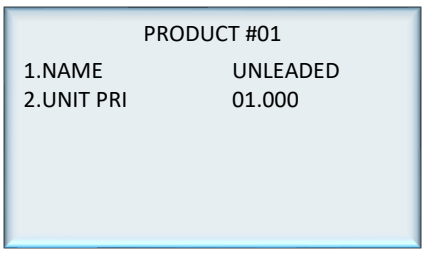
Auth time out can be changed by pressing 4 and entering a new value.

5. Product (Only available in hybrid mode)

Select PRODUCT from the main menu.

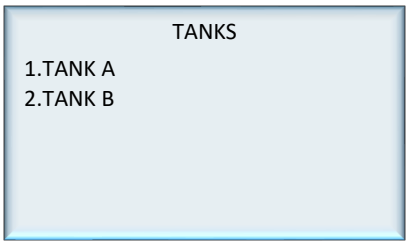


Select any product to set a new product or change an existing product.

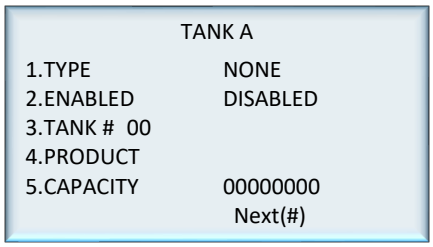


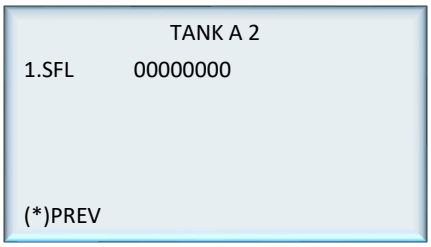
1. Products can be named by selecting a desired product number and entering a name.
2. Once a product is established, a unit price can be set for each product.

6. Tanks (Only available in hybrid mode)



Select TANKS from the main menu and select TANK A or TANK B.





1. The tank gauge type can be changed by selecting 1.
2. The options are VDR, Vega, Virtual, Fafnir.
3. Tank gauging can be enabled or disabled by pressing 2.
4. The tank number and capacity can be set by selecting the desired functionality and entering the new value.
5. The product can be set by pressing 4 and selecting an established product.
6. Safe fill level can be changed by pressing 1 and entering the new value in litres.

CompacOnsite

To access CompacOnsite, the device ID is needed. The following should be entered into an internet browser, replacing device ID with the specific ID of the unit. Refer to Local Setup for instructions on finding the Device ID.

https://deviceID.compaconsite.com

The standard passwords are shown below.

IMPORTANT NOTES:

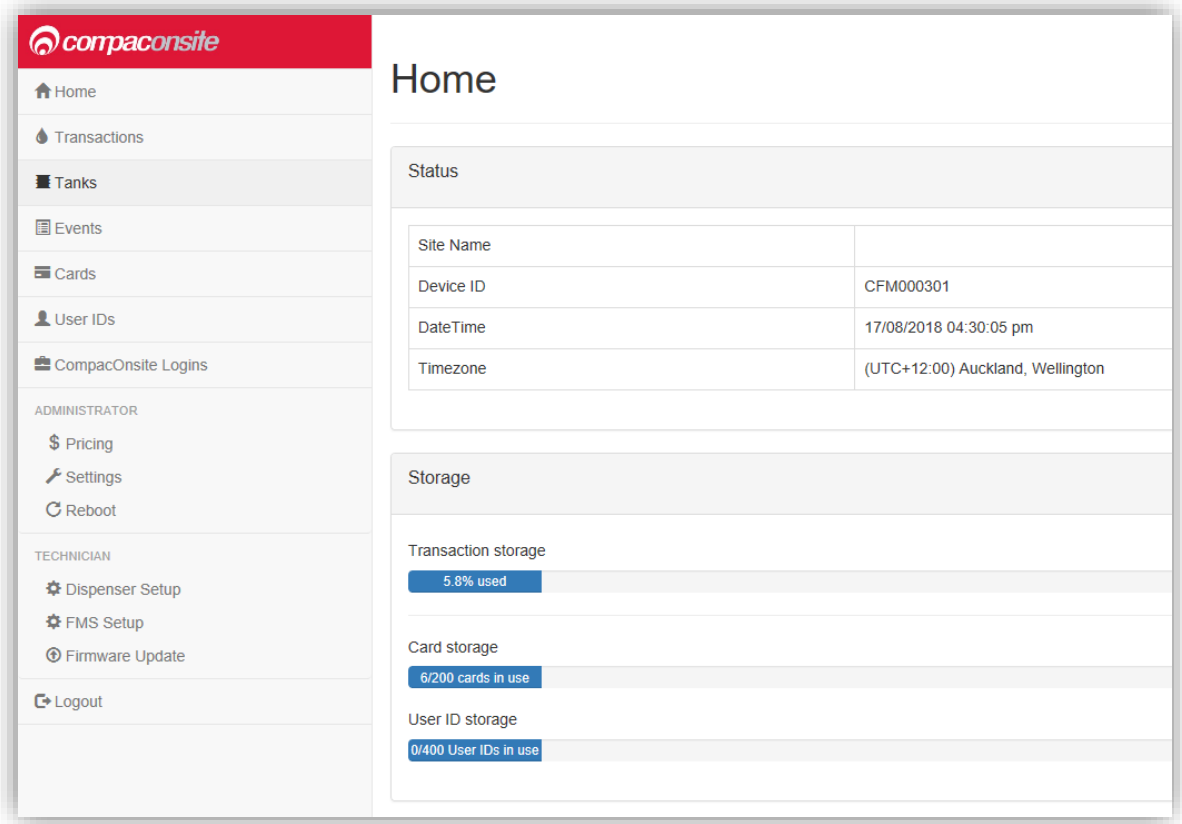
For the security of the site, ensure the passwords are changed once the unit is installed.

Access to online data is heavily dependent on the unit being powered on and connected to the internet. Ensure the unit is online in order to have full access to all site data.

Username	Password
user	c0mpac5KUser
admin	c0mpac5KAdmin
tech	c0mpac5KTech

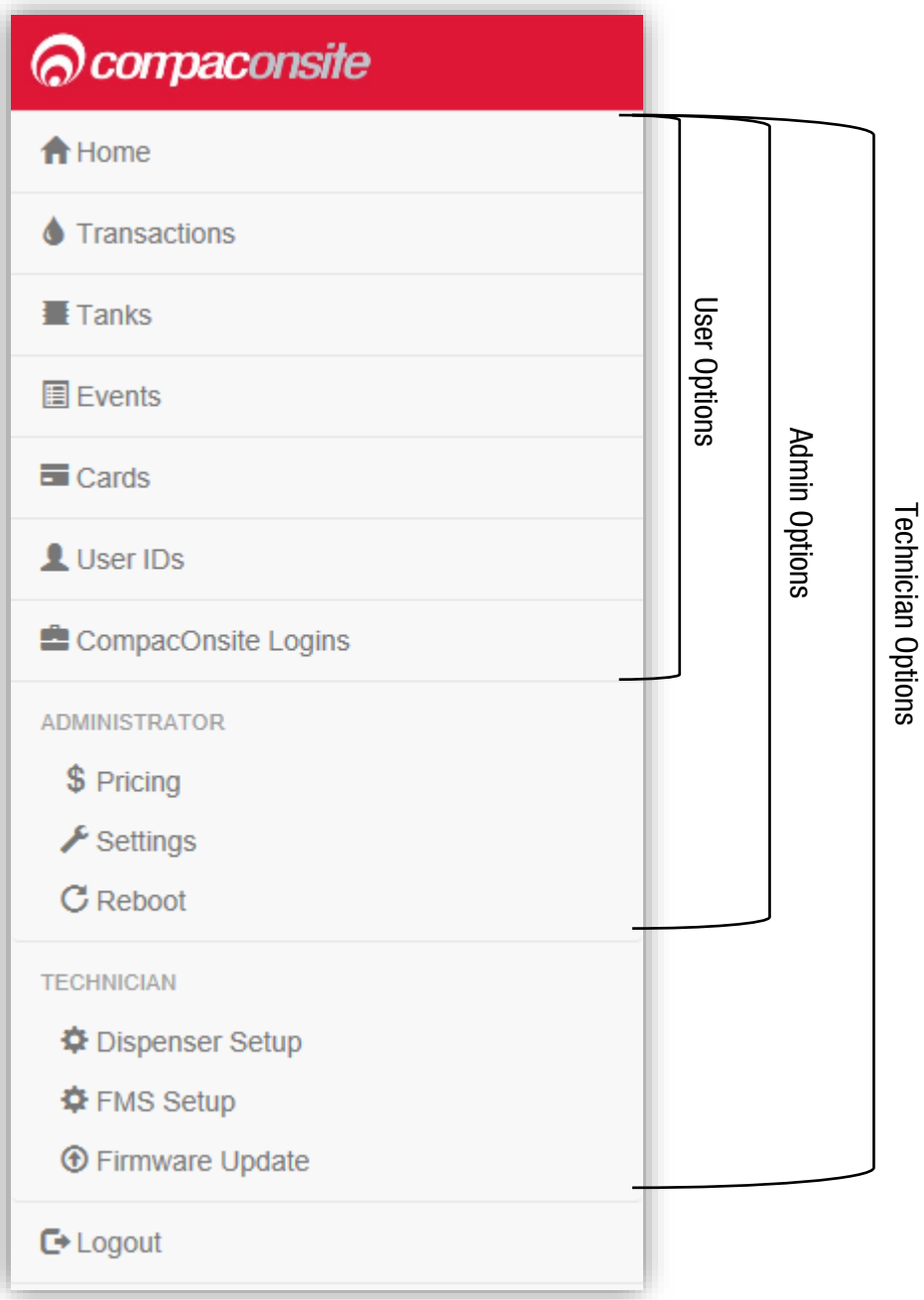
After log in, the CompacOnsite home screen will appear.

NOTE: *The side bar will look different depending on the access level of the user.*



Users

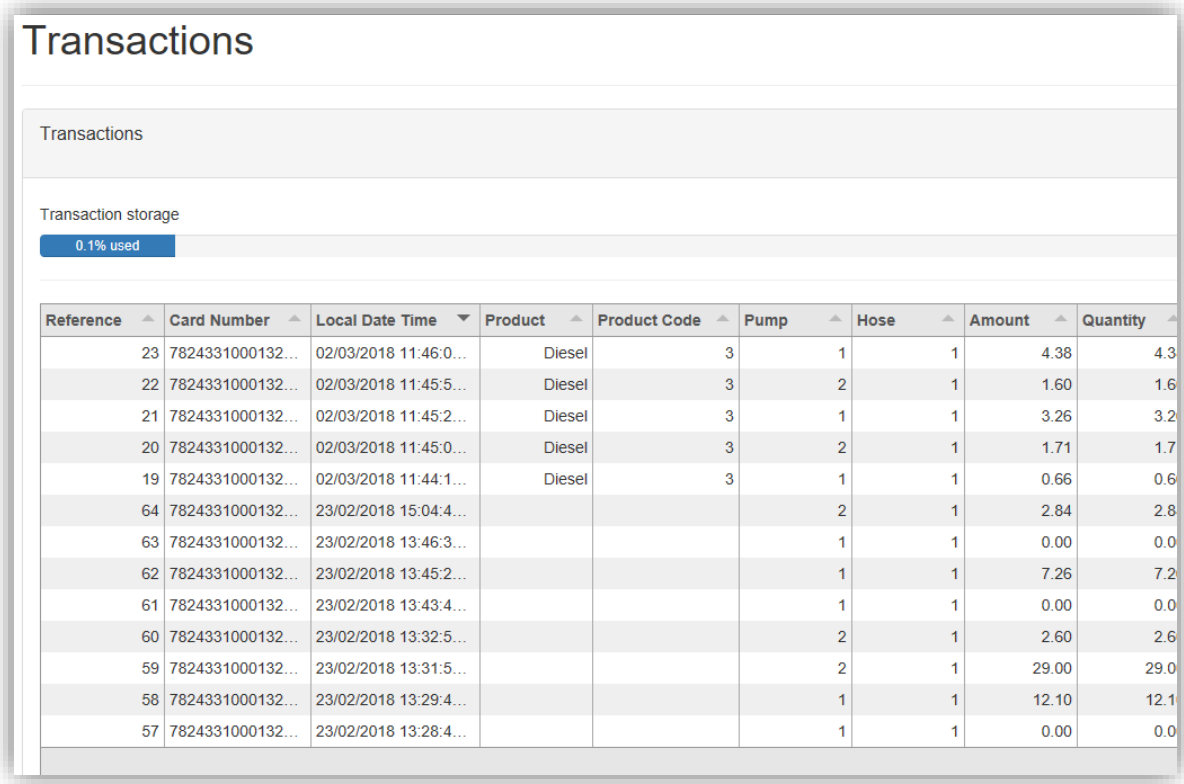
There are three different user options when logging into Compac Onsite; standard, technician and administrator. Each user can access different functionalities. Standard users can access all basic functionalities, such as tanks, cards and transactions. Admin users can also access these, as well as being able to access the system settings and reboot. The technician can access all these options, as well as being able to access set up options which are needed when setting up the site.



Standard User Options

Users have access to all the following basic functionalities.

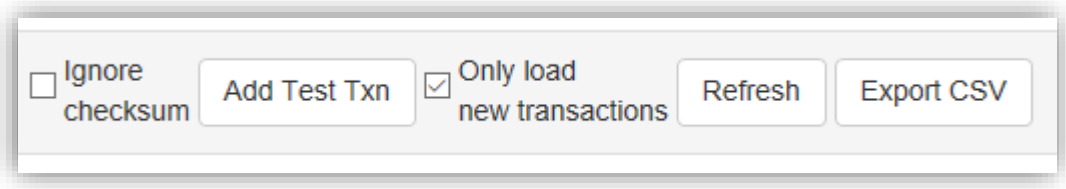
Transactions



Reference	Card Number	Local Date Time	Product	Product Code	Pump	Hose	Amount	Quantity
23	7824331000132...	02/03/2018 11:46:0...	Diesel	3	1	1	4.38	4.3
22	7824331000132...	02/03/2018 11:45:5...	Diesel	3	2	1	1.60	1.6
21	7824331000132...	02/03/2018 11:45:2...	Diesel	3	1	1	3.26	3.2
20	7824331000132...	02/03/2018 11:45:0...	Diesel	3	2	1	1.71	1.7
19	7824331000132...	02/03/2018 11:44:1...	Diesel	3	1	1	0.66	0.6
64	7824331000132...	23/02/2018 15:04:4...			2	1	2.84	2.8
63	7824331000132...	23/02/2018 13:46:3...			1	1	0.00	0.0
62	7824331000132...	23/02/2018 13:45:2...			1	1	7.26	7.2
61	7824331000132...	23/02/2018 13:43:4...			1	1	0.00	0.0
60	7824331000132...	23/02/2018 13:32:5...			2	1	2.60	2.6
59	7824331000132...	23/02/2018 13:31:5...			2	1	29.00	29.0
58	7824331000132...	23/02/2018 13:29:4...			1	1	12.10	12.1
57	7824331000132...	23/02/2018 13:28:4...			1	1	0.00	0.0

NOTE: *Table columns shown on page can be expanded.*

The Transactions storage is limited. When Transaction storage is at 100%, the user will have to Export CSV. This will reset the Transaction storage bar and cause the data to be stored in a separate place in the system. This allows more transactions to be recorded.

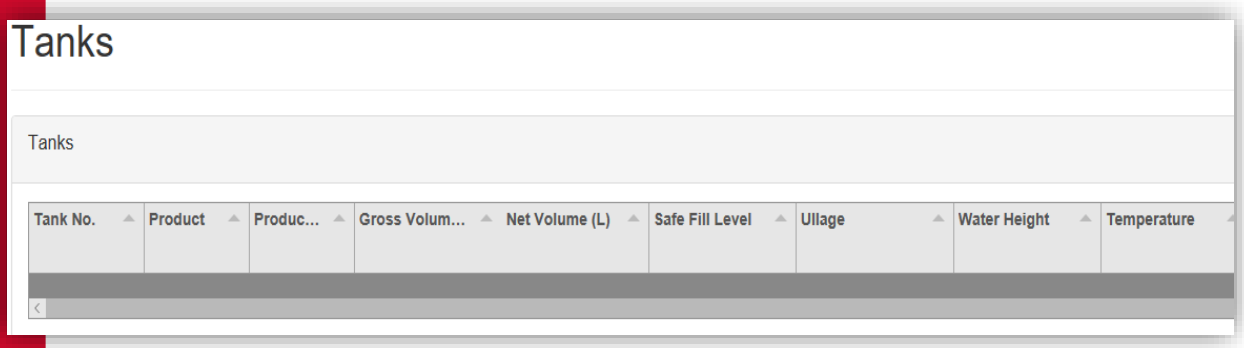


NOTE: *Select Refresh before adding more transactions.*

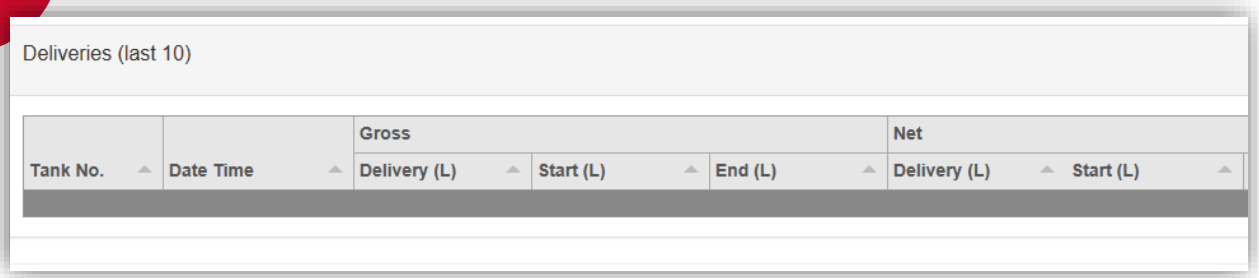
Transactions that have not been exported will be viewed in the screen as default. To show exported transactions untick 'Only load new transactions'.

Tanks

The Tanks section indicates product details and volume of fuel in the tank.



Deliveries indicate when the last transaction occurred, including tank number and date time.

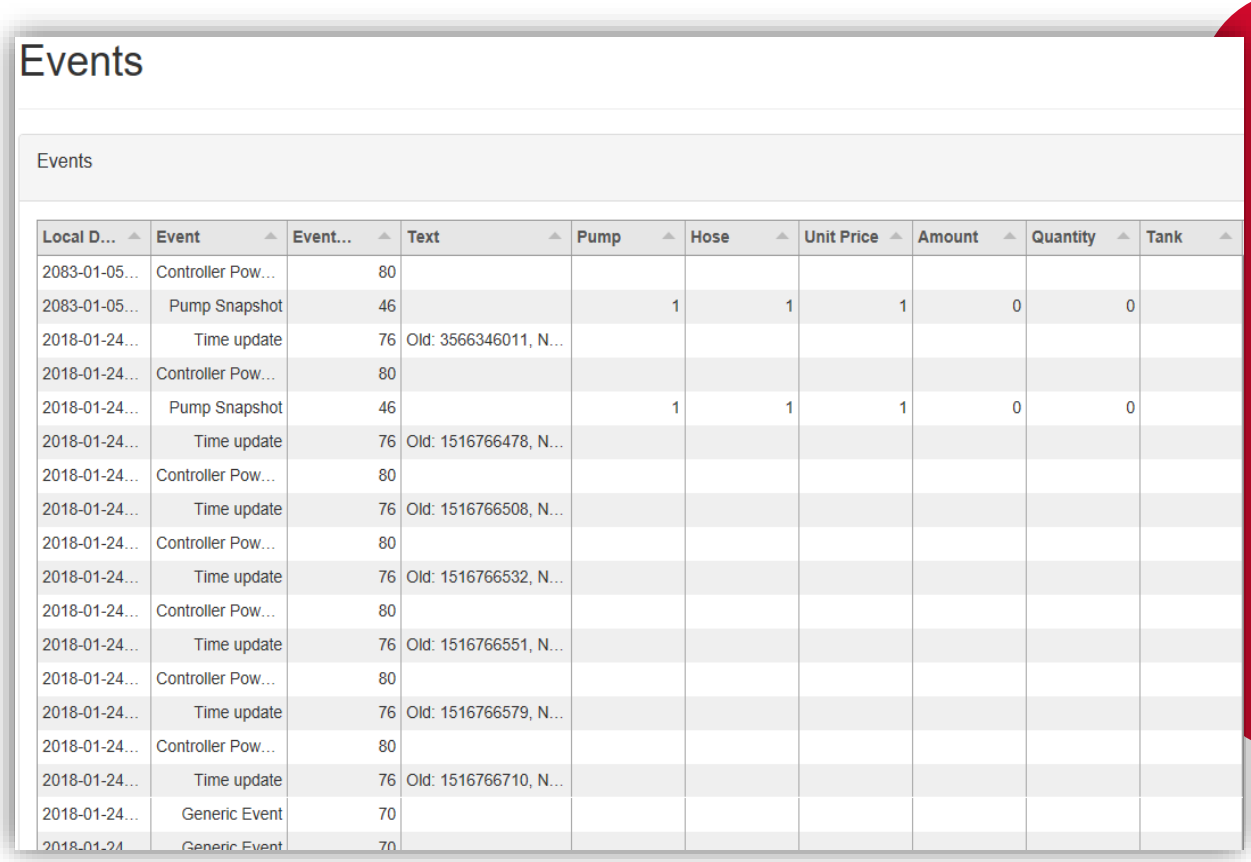


The data in this section can be downloaded by pressing Download. Select Refresh to view new data.

NOTE: *A reboot is required for any changes to be applied.*

Events

Events are notable events that occur with the pumps. The main event that should be examined is the Pump Snapshot event. This is an accumulative amount of fuel that has been pumped from the selected pump. Select Download to download the list of events on screen. Select Refresh to load the most recent events.



Cards

In this section, a new card can be created with Create New card. Decide on a card number, PIN and owner details, then select Submit.

NOTE: *Ensure Enabled box is ticked to validate card.*

If a mistake has been made, select Edit and edit card details. Select the trash can icon if a card is not needed. The maximum Card storage is limited at 200 cards.

User IDs

Card Number	Enabled	PIN	Card Total (l)	Owner detail 1	Owner detail 2	
12345	✗		0.0	123	456	Edit
123213	✗		0.0			Edit
123456	✓		0.0	123	456	Edit
245687f	✗		0.0	123	456	Edit
24568789	✓		0.0	123	456	Edit
1234567890123456...	✗		0.0			Edit
1234567890123456...	✗		0.0			Edit
ABCD1234	✗	1234	0.0	K	John	Edit
ERCD1234	✗	3333	0.0	G	Q	Edit

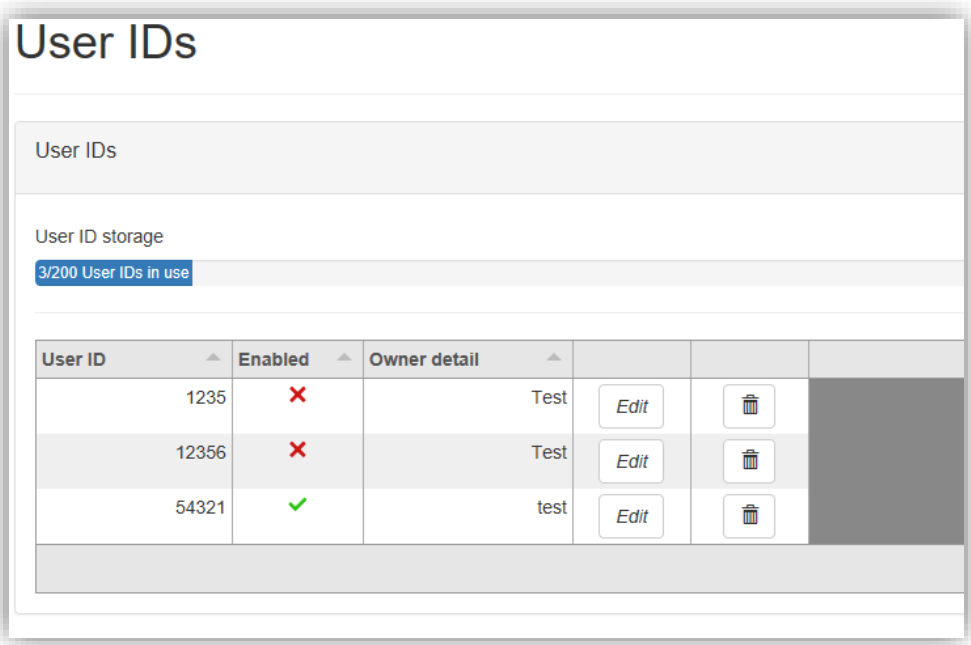
User IDs consist of any 6 numbers or less. Select Edit to Edit User IDs and owner details. Tick the enable box to make the User ID valid for use. The trash can icon can be selected to permanently delete the user.

NOTE: *A card can have multiple users.*

Different users will have different User IDs. The purpose of this is to know which user has made a transaction, and ensure they are only fuelling when required.

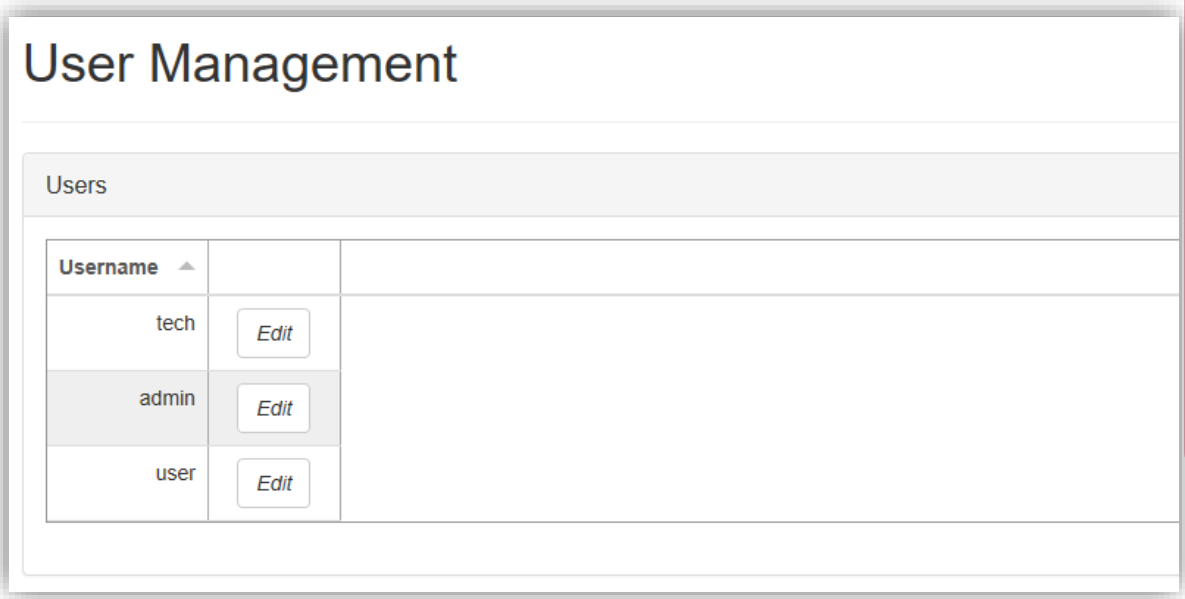
NOTE: *All files created* ***MUST*** *be a csv file not an excel file.*

Import User IDs is another way of inserting new users. It may be easier for bulk user adding.

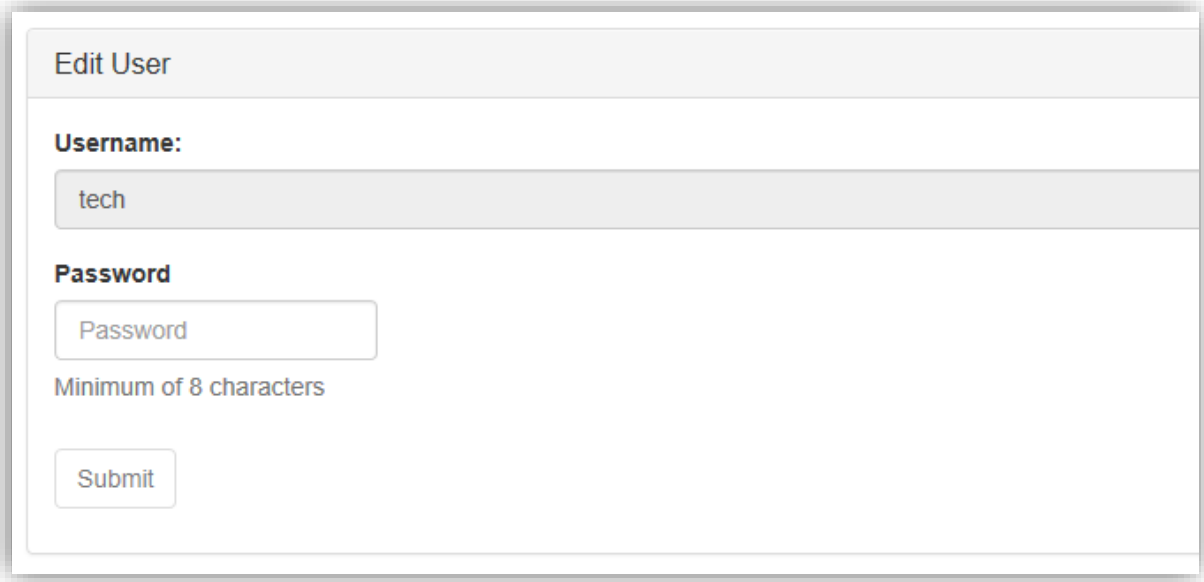


CompacOnsite Logins

For the security of the site, the standard passwords should be changed during set up of the unit. In case the passwords were not changed during installation, the process is outlined here. To change the passwords, go to CompacOnsite Logins, shown in the left options tab.



Not all users may be shown depending on the access level of the user. To edit, select Edit.



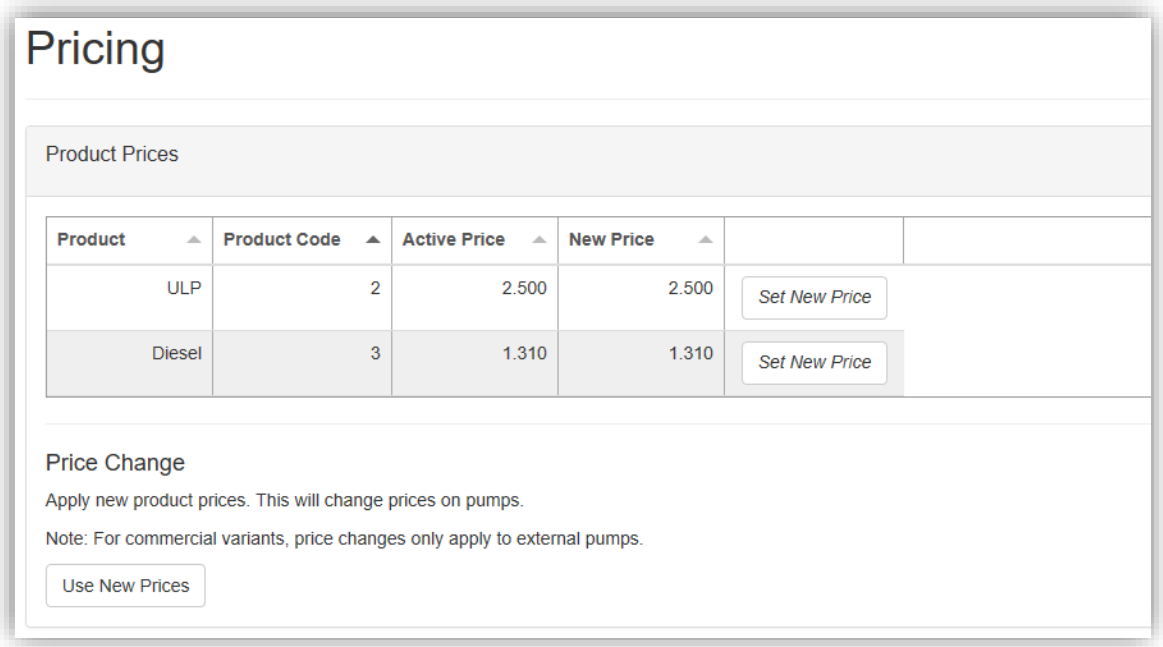
Enter the desired new password, confirm this and press Submit.

Administrator Options

Administrators can access all the above options, as well as being able to access pricing, settings and reboot.

Pricing

From pricing, the pricing for different products can be viewed and changed.

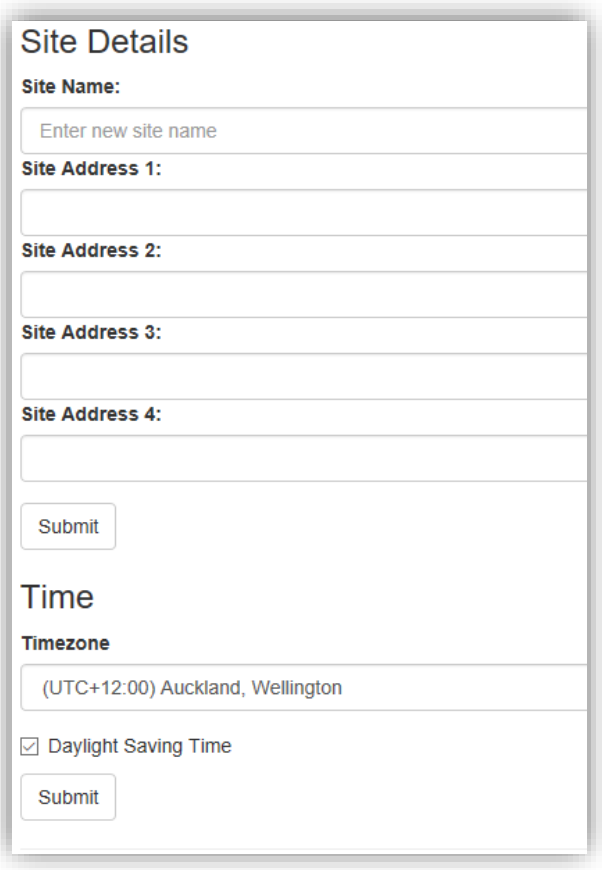


The Active Price is the price being used currently for the pumps. To change this, select Set New Price.

Enter the new price for any product and select Change Price. This will change the New Price. However, the unit will continue to use the Active Price until Use New Prices is selected, under Price Change. Clicking this will change the Active Price and update them to the New Price.

Settings

Settings can be used to set site details. Enter the site details and press submit.



Timezone can also be set. In some cases, timezone will be automatically synced. Enter the timezone and press submit.

Reboot

Reboot is used to restart the application. Some settings require rebooting to update recent actions. The page needs to be refreshed after the Reboot process has been completed.

NOTE: *The unit can only be rebooted when no transactions are taking place.*

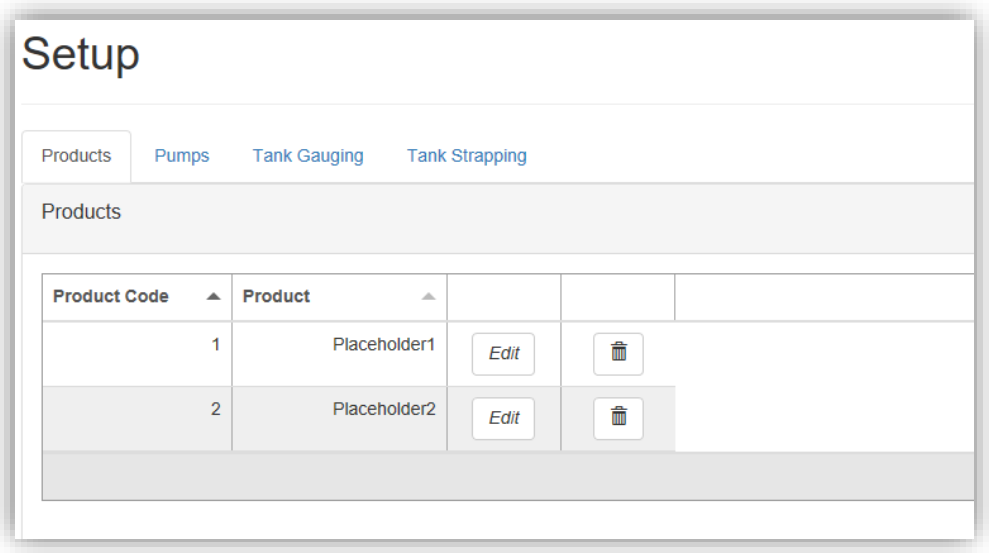
When someone is refuelling the C5000 unit can not be rebooted. The pumps may stop fuelling as the transaction has been interrupted.

Technician Options

Technician users can access both administrator and standard user options. As well as this, they can access site setup options.

Dispenser Setup

Dispenser Setup will bring up a setup menu with four options; Products, Pumps, Tank Gauging and Tank Strapping.



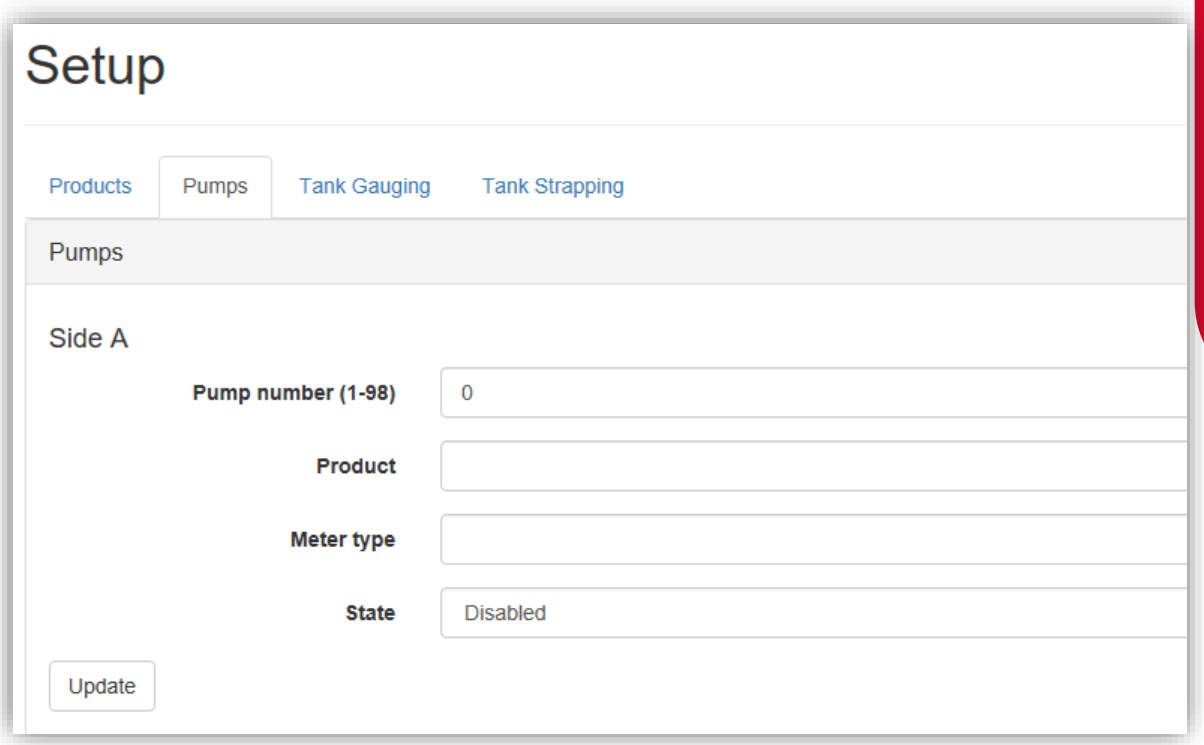
In the Products tab, the current products can be viewed.

To create a product, Add Product can be selected. The product must be named and numbered before it can be saved. The following menu will appear.

Pressing Submit will add the product. When a product is edited the same menu will appear, and the product's name and number can be changed before resubmitting.

To delete a product, select the recycle bin icon in the products table, and click OK on the pop-up.

The next tab is the Pumps tab. From this tab, the configuration of the unit (single or dual) can be chosen, as well as the settings for each pump.

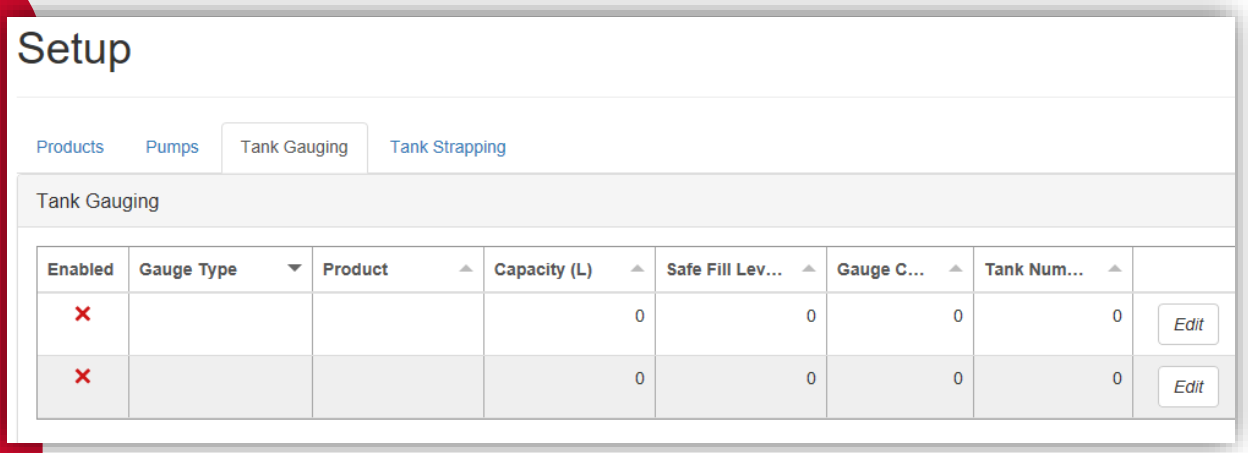


Depending on the chosen configuration, only one side may be displayed.

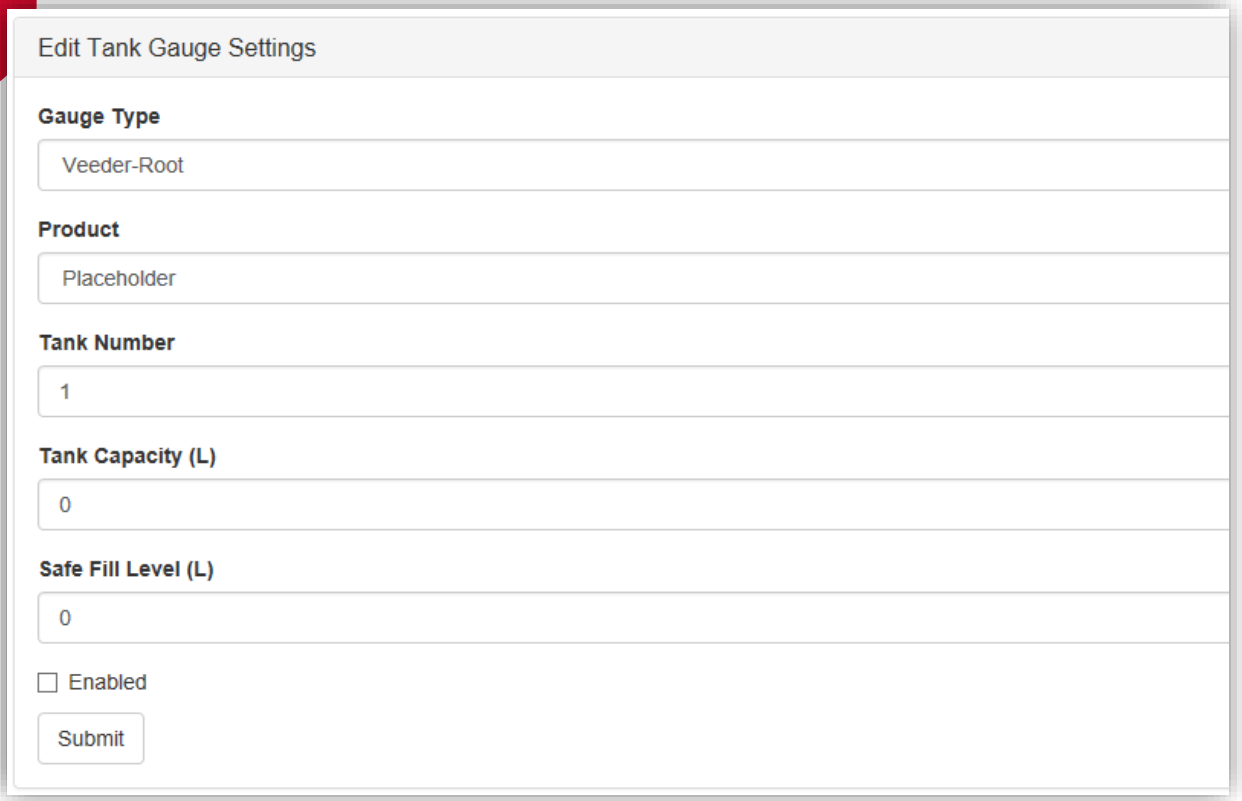
To change the Pump number simply enter the new value and press Update.

To change the product, meter type or state, select the relevant option from the drop down menus and press update.

The Tank Gauging tab shows which tank gauge is selected for each tank.

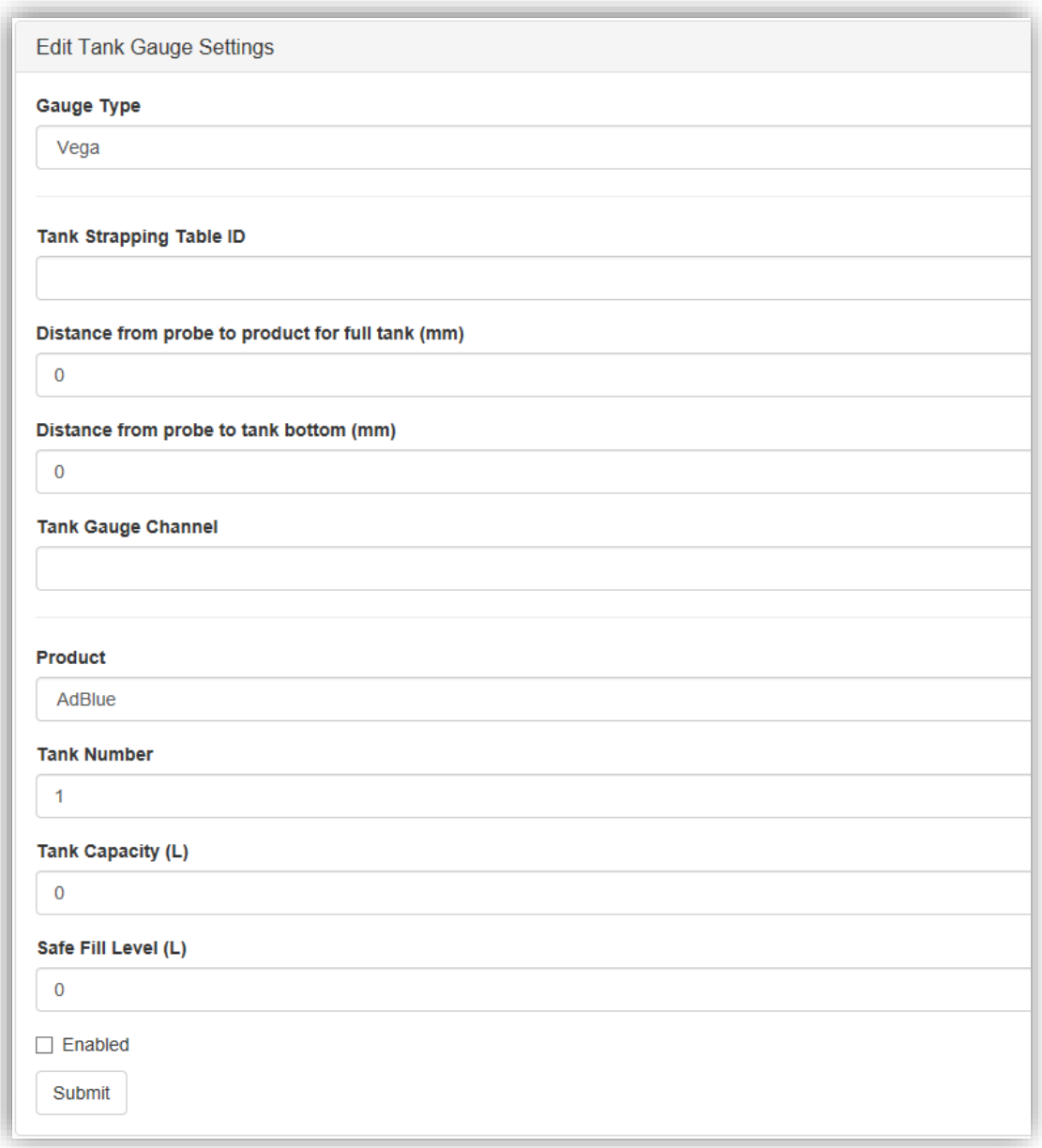


The current settings can be viewed. To edit a row, select Edit.

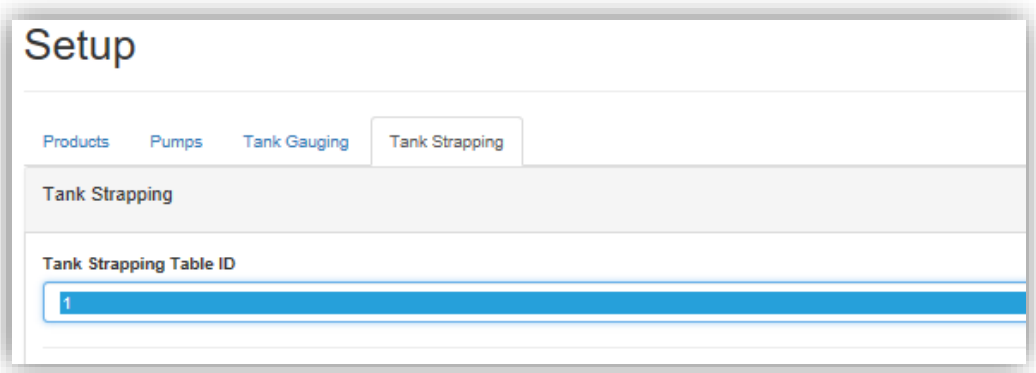


To change a setting, enter the new setting and Submit the new values.

If a Vega tank gauge is being used, more information is required. The required fields will automatically appear if a Vega meter is selected.



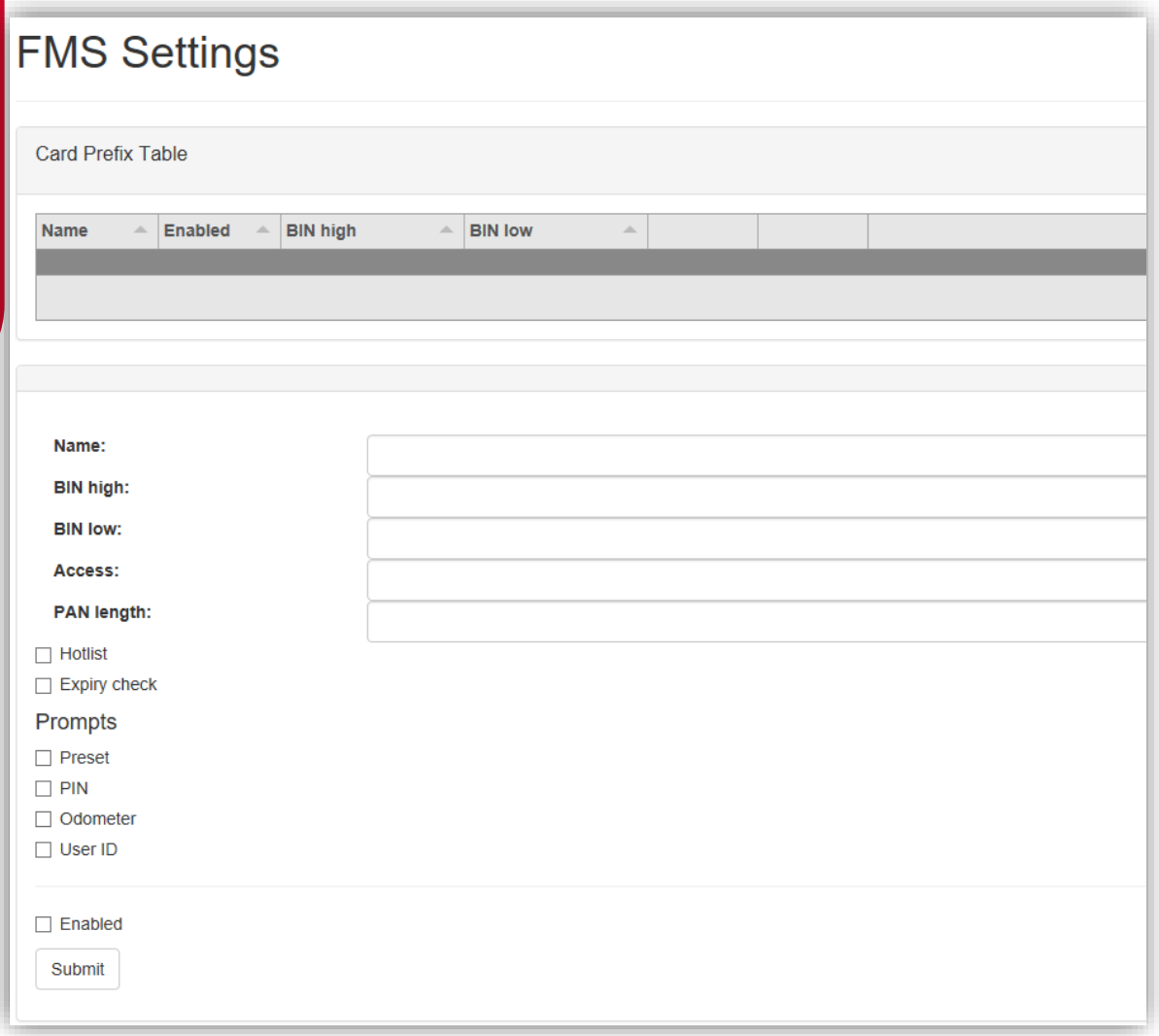
The final tab in Dispenser Setup is the Tank Strapping section. This section is only relevant if a Vega meter is fitted. Refer to Vega Tank Strapping for information.



To download the tank strapping table, select download current strapping table. At the bottom of the page, tables can be uploaded and the table template can be downloaded. Use the table ID drop down menu to select the table ID.

FMS Setup

When setting up the unit, the FMS setup tab can be used to set up card records.



Cards can be imported and exported as .csv files. This option can be found in this tab. To add a new card, fill in the required fields and check which prompts are desired. Checking Enabled will enable the card. When the card is finished, press Submit. Current cards can be viewed in the Card Prefix Table.

Vega Tank Strapping

If a Vega electronic dipstick is being used, a tank strapping table will need to be created to gauge the amount of liquid in a tank. To do this, the tank dipstick will need to be accessed. This is a ruler showing volume that is a component of tanks.

To make a tank strapping table:

1. Download the table template from the Tank Strapping section on CompacOnsite. The table is shown below
2. Take the dipstick from the tank
3. Using a measuring tape and the dipstick, record the readings on the dipstick (these will be a volume) and the corresponding length from the bottom of the dipstick (which rests on the bottom of the tank)
4. Fill the table template with a table relating length from the bottom of the tank and volume. This will be the Tank Strapping table
5. Upload this onto CompacOnsite

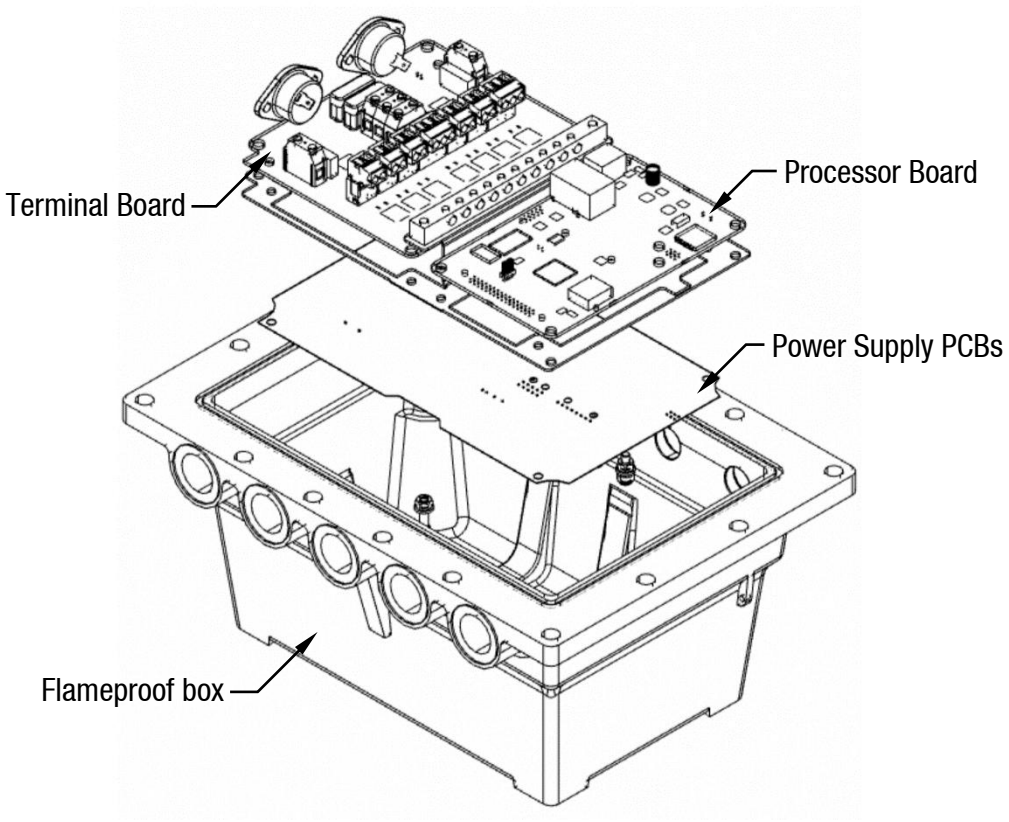
After making a table, reinsert the dipstick into the tank and then read the volume of fuel in the tank. This is also required on CompacOnsite.

NOTE: *The more readings done on the tank, the more accurate the tank gauging will be.*

Level (mm)	Volume (l)
65535	65535
65535	65535
65535	65535
65535	65535
65535	65535
65535	65535
65535	65535
65535	65535
65535	65535
65535	65535
65535	65535
65535	65535
65535	65535
65535	65535
65535	65535
65535	65535
65535	65535

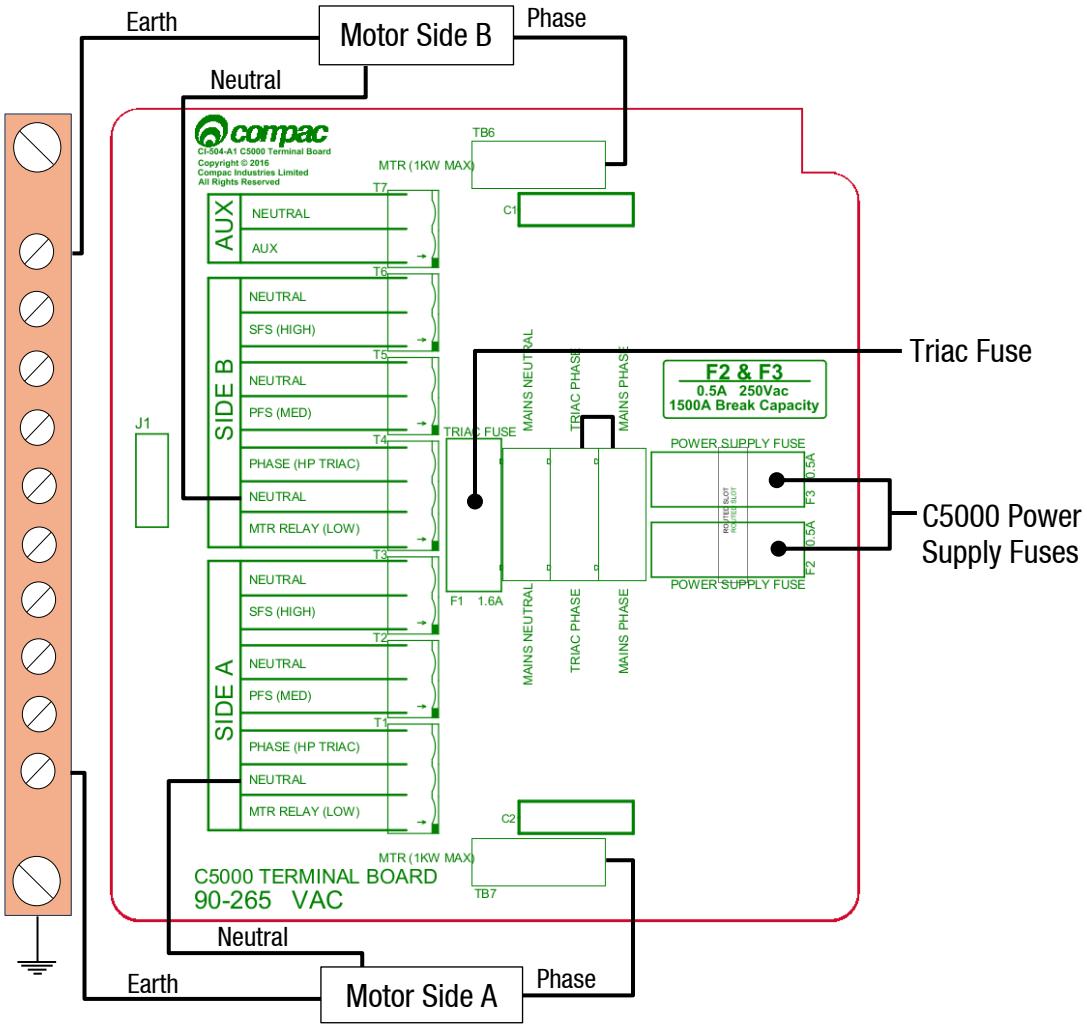
Electronics

The Fillmaster's power supply is found within the flameproof box, located on the unit. The power supply contains the processor board and the terminal board. The master dispenser contains the C5000 electronics. The unit will be pre-wired, with external connections coming into the terminal board, and from the K-Factor board.



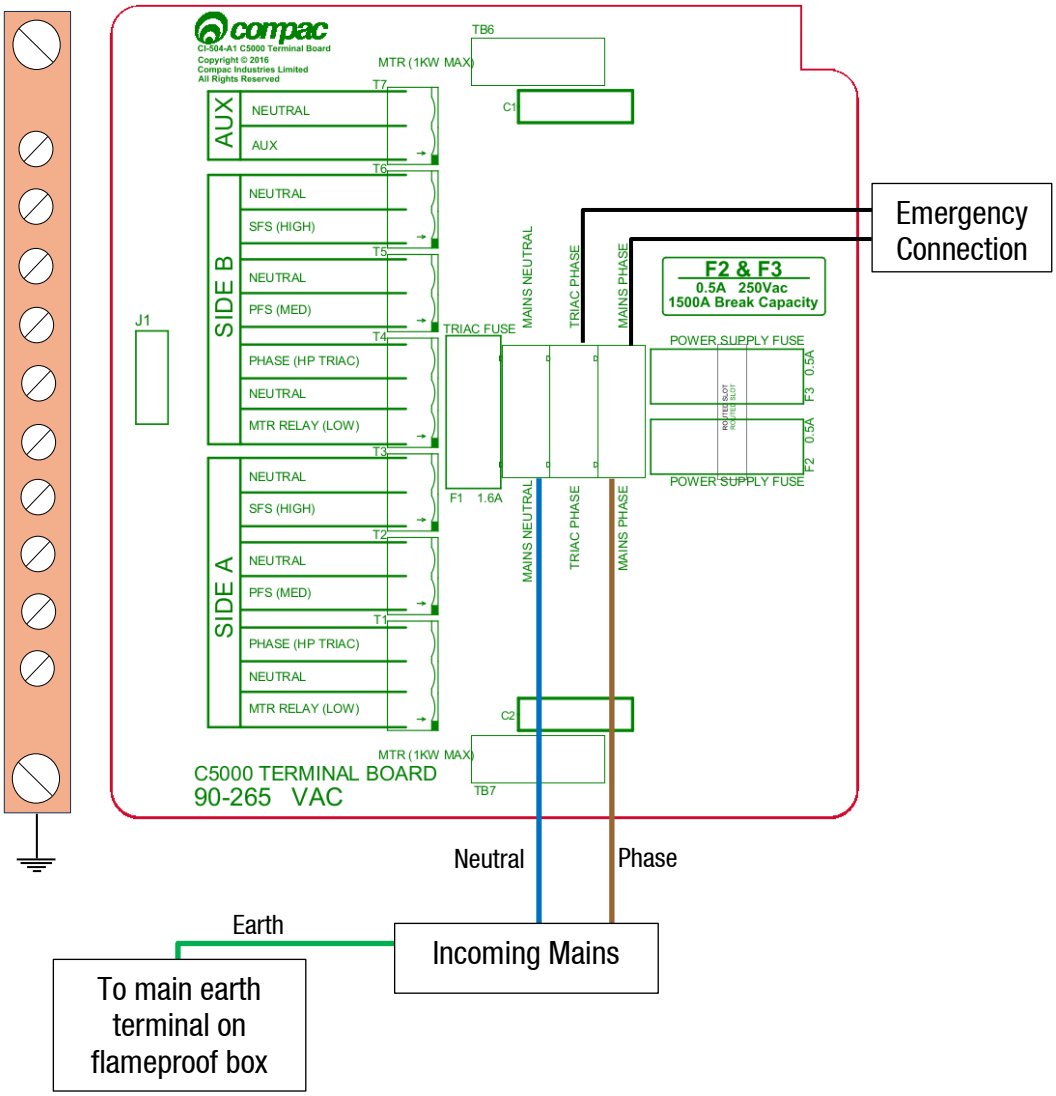
Terminal Board

The terminal board is located inside the flame-proof box of the C5000, on the top layer of the power supply. The motor can be connected to the terminal board for both side A and side B. These connections should be pre-installed, however, they are shown here for maintenance and service reasons. The location of the fuses on the terminal board are also shown. It is important to note the position of these when troubleshooting the unit.



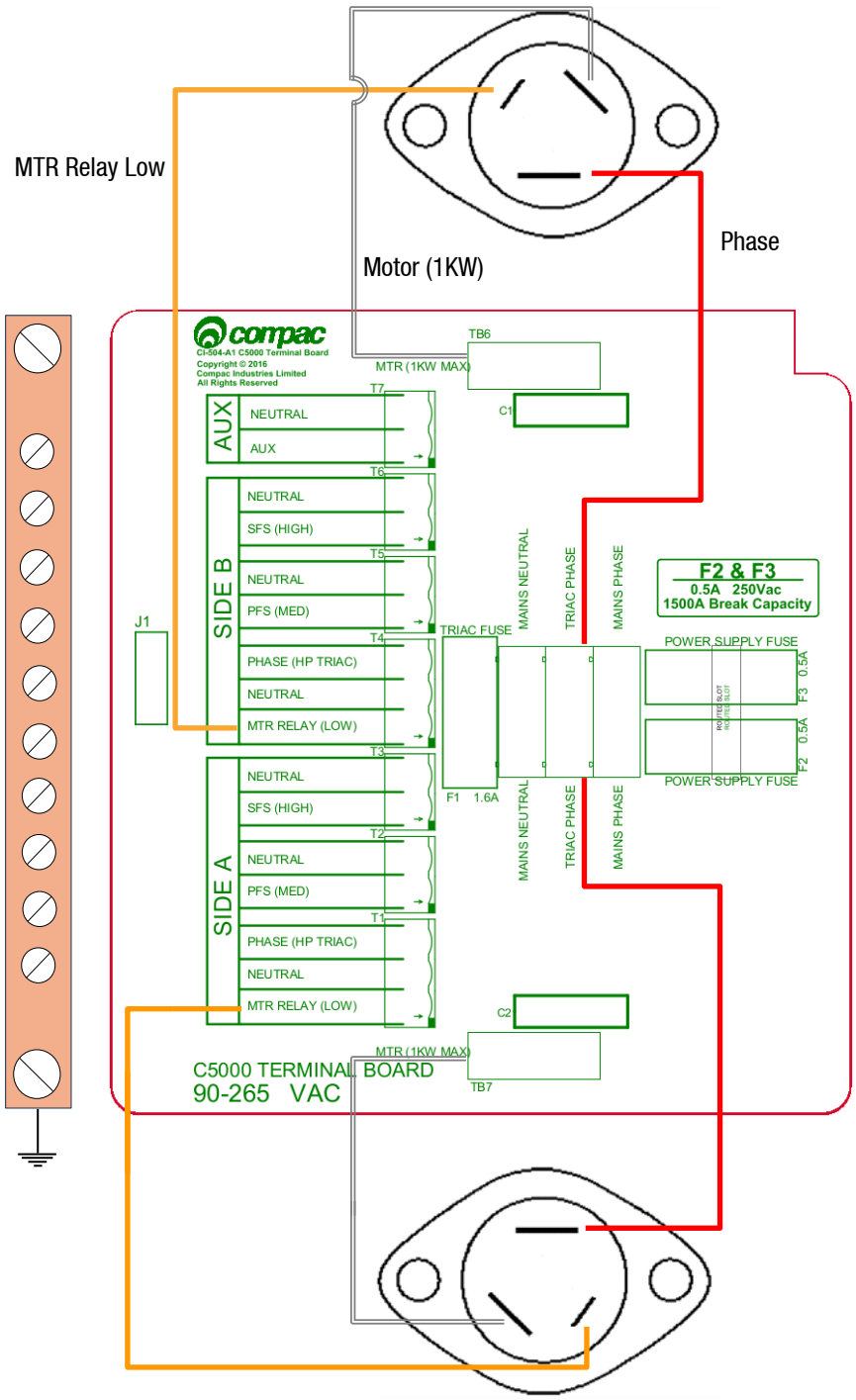
The incoming mains connection should have been connected during installation, however, the wiring is shown here for maintenance reasons. An emergency stop connection, if desired, can be wired into the terminal board wiring, shown below. This will be in place of the normal loop between the triac and main phases. Wires have standard colours which are shown. In case these are unclear, the colours are as follows:

- Incoming mains phase: Brown
- Incoming mains neutral: Blue
- Incoming mains earth: Green/Yellow



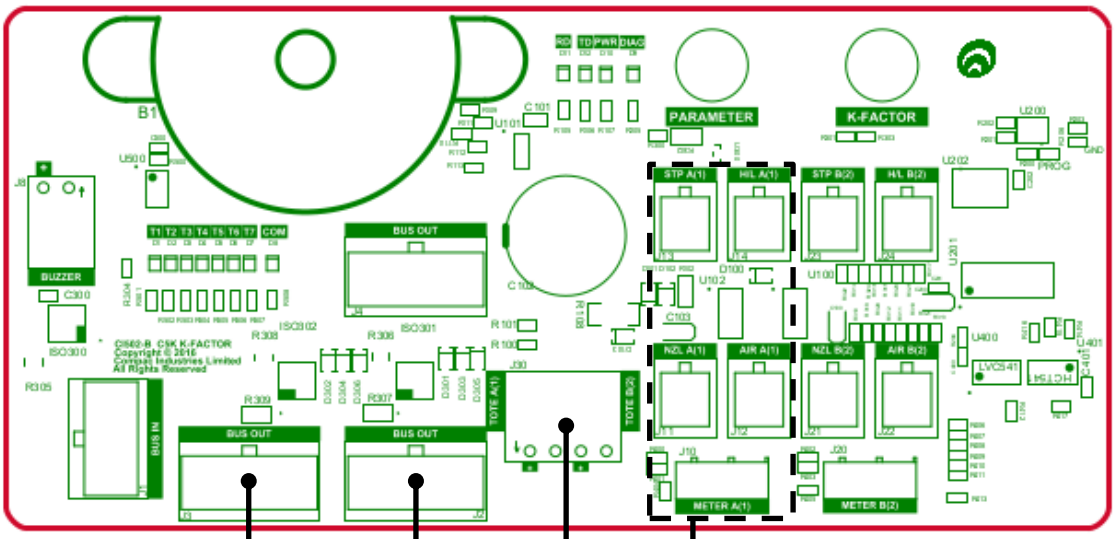
The triac wiring is pre-installed and, in most cases, will not need to be changed. However, the wiring is shown here to aid triac replacement or other service procedures. These are colour coded with standard colours. In case these are not clear, the colours are as follows:

- MTR Relay: Orange
- Phase: Red
- Motor: White



K-Factor Board

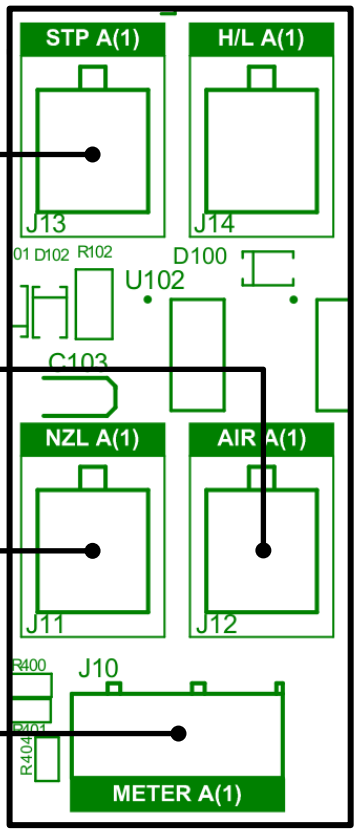
The nozzle switch, sump, air switch, and meter should be connected to the K-Factor board. These connections are as shown. The K-Factor board has connections for both side A and side B. Current C5000 units are operable with side A only. The K-Factor switch should be sealed for security. Optional mechanical totes can also be connected to the K-Factor board, which increment mechanically with each litre of fuel dispensed.



Bus out system cables - can connect slave display to here

Connect optional mechanical totes to here

Side A Connections



Connect Sump Switch to here

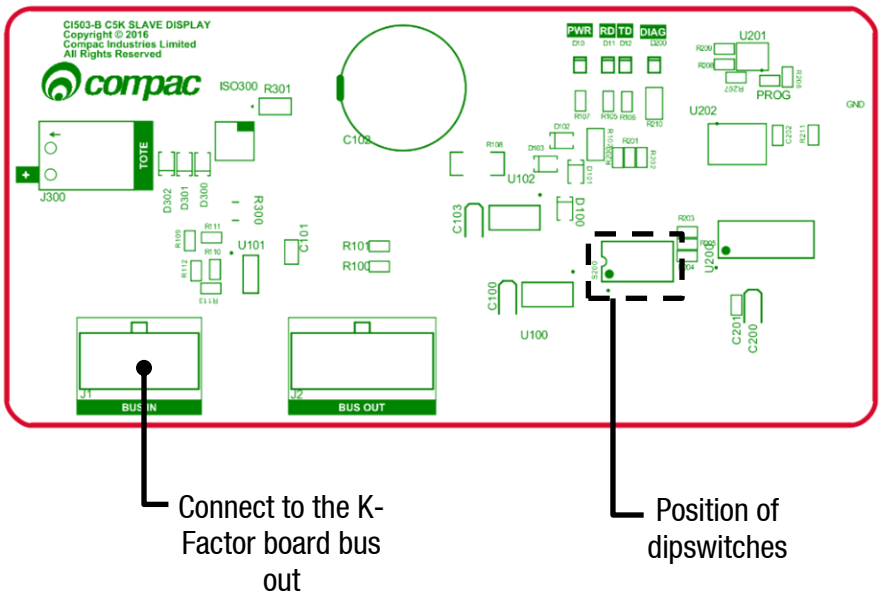
Connect Air Switch to here

Connect Nozzle Switch to here

Connect Meter to here

Slave Display Board

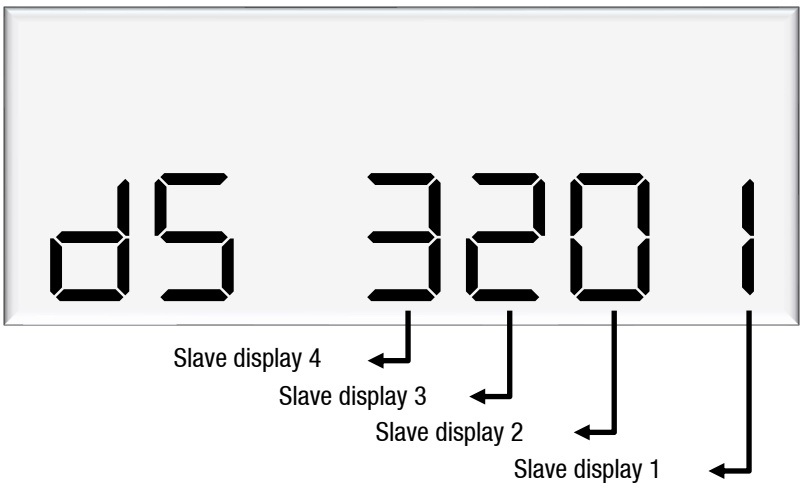
The Fillmaster has a slave display, found on the back of the unit. This is controlled by a slave display board, found on the inside of the unit.



Configuring Slave Displays

Slave displays can be configured as, a clone of the main display, to show side A, or to show side B. Otherwise, it can be disabled. Slave display configuration is a two-step process.

1. Change dS setting to assign a side to the slave display
2. Assign the correct number to the slave display by changing the slave display board dip switches.



The first digit correlates to slave display 1, and so on. In this example slave display 1 - clone, slave display 2 - disabled, slave display 3 - side A and slave display 4 - side B.

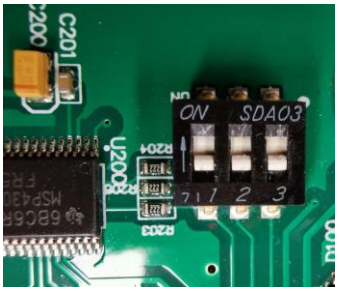
Note: *Each digit can have 4 different values, each value has a different meaning.*

0 – Disabled
1 – Clone
2 – Side A
3 – Side B

Assigning a number to slave display

Slave display numbers can be set with dip switch 2 and 3 on the slave display board. Use the following table as a guide to configure the slave displays

Slave Display	Switch 1	Switch 2	Switch 3
1	OFF	OFF	OFF
2	OFF	OFF	ON
3	OFF	ON	OFF
4	OFF	ON	ON



CAUTION : *Make sure the device is powered off before attempting to change the dip switches*

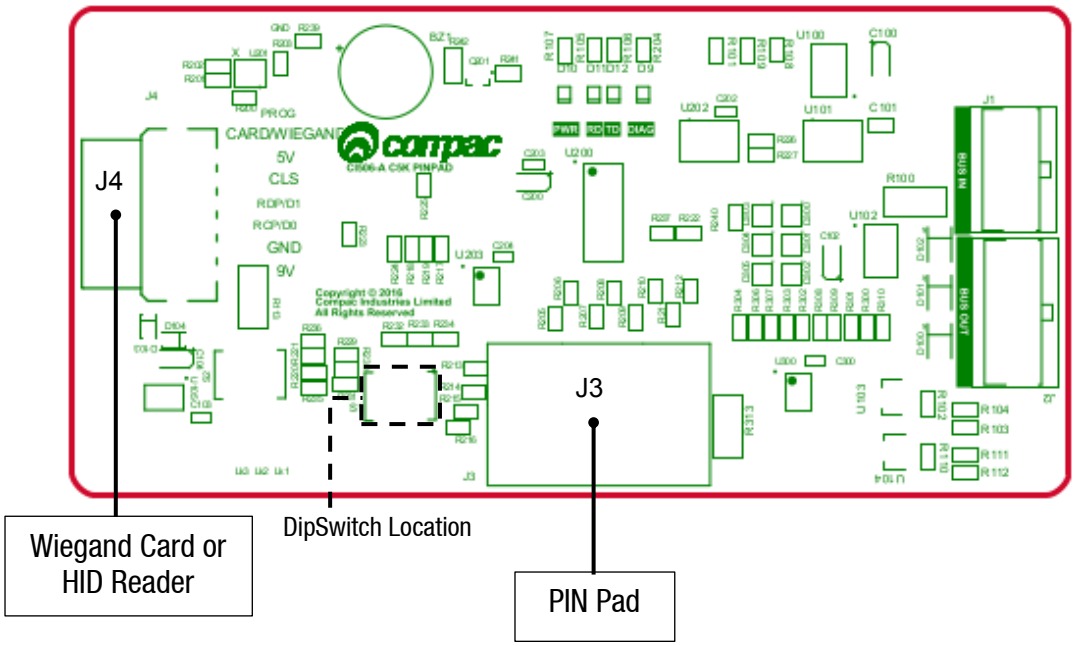
PIN Pad Board

The locations of three dipswitches on the PIN pad board are shown. Switch one changes the configuration of the unit between Cardreader and HID reader.

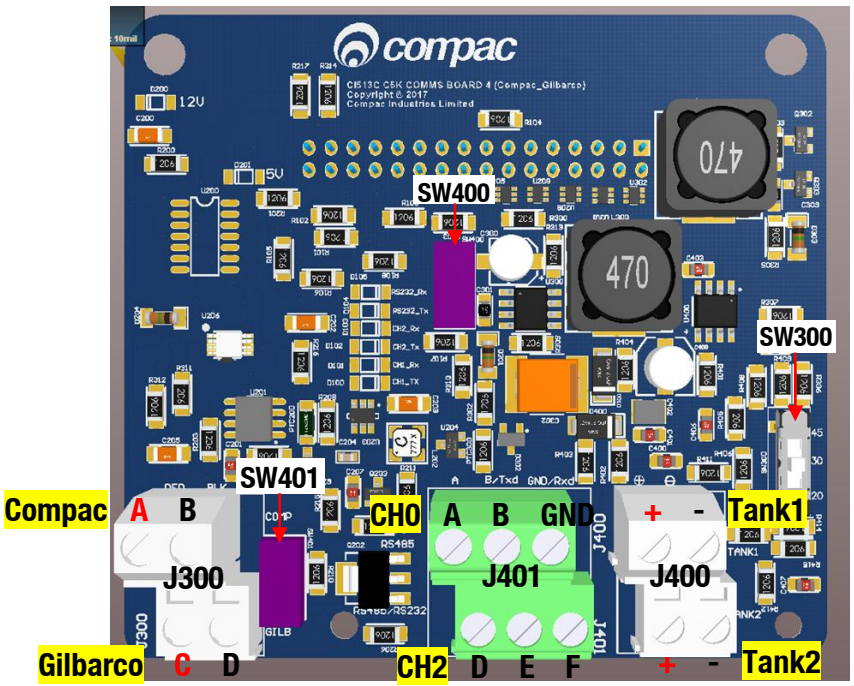
- If Switch 1 is ON, the unit is in HID mode
- If Switch 1 is OFF, the unit is in Cardreader mode

Having this switch in the incorrect position will display XXXXXXX on the main display when a card or HID is used to take fuel. If the dipswitch position is changed, the unit must be repowered for the changes to take place.

Switches 2 and 3 are not currently used.



Comms Wiring



If Compac or Gilbarco comms are being connected, connect to the J300 port on the comms board as shown below.

Protocol	Channel	J300 terminal	
Compac	1	A - RED	B - BLACK
Gilbarco	2	C - RED	D - BLACK

Switch SW300

This switch is used for current loop systems on channel 1 (e.g. Gilbarco, Wayne). Adjust the switch according to the current (mA) of the site protocol as required. There are three current options.

Site Protocol	SW300 switch position
Wayne	45
Gilbarco AUS	30
Gilbarco USA	20

RS232 and RS485 comms

If RS232 or RS485 comms are being used, use the table below to configure the switches and connect the comms.

J401 channel 0 is wired to the upper terminals whereas channel 2 RS485/RS232 is wired to the lower terminals.

COMMS/terminal block	SW400	SW401	Channel	Terminal		
RS485 on J300 *Note	N/A	N/A	0	GND	RS485-A	RS485-B
RS485 on J401	OFF	OFF	2	GND	RS485-D	RS485-E
RS485 on J401 with a terminator	OFF	ON	2	GND	RS485-D	RS485-E
RS232 on J401	ON	OFF	2	GND	RS232-E (Txd)	RS232-F (Rxd)

***NOTE:** J300 is shared with Compac Comms. Therefore, a site with Compac comms cannot use this RS485 channel.

Tank Gauge comms

Use J400 for 4-20mA tank gauge connections. Up to two tank gauges can be connected to J400.

GPIO board

GPIO Pulse Input

Overview

The Pulse input is designed to interface the Compac dispenser to a third party meter. The Pulse input can be up to 35 VDC.

There are 2 settings that need to be set to enable the C5000 for third party meter input. The first is in the CA/CB. The CA/CB needs to be set to CA XXXXXX5.

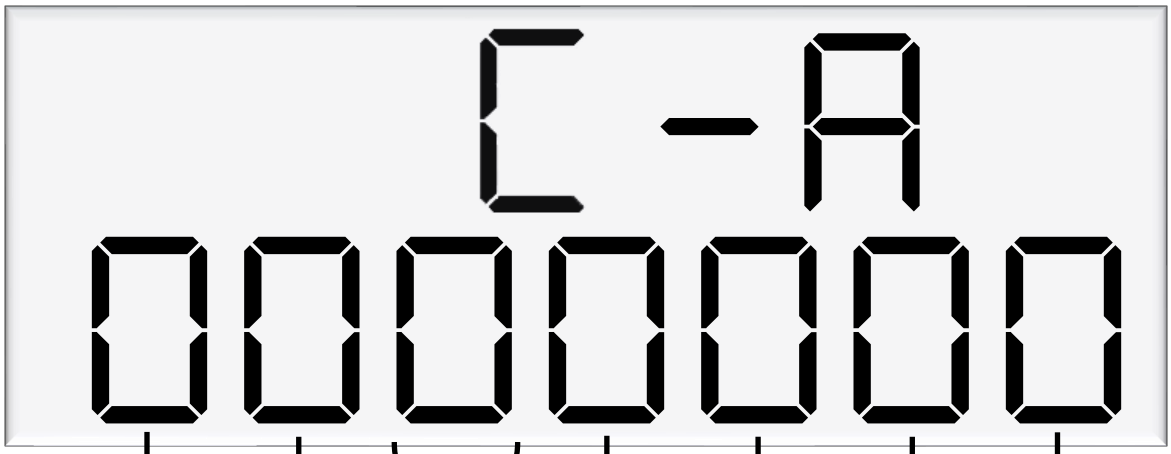
The Pulse input can be configure for the following meter types

- Single channel
- Two channel quadrature
- Three channel

.

CA/CB Setting for third party input

To tell the C5000 to read meter pulses from the GPIO board you need to set the CA/CB to XXXXXX5. This 5 disables the meter input on the K Factor board and tells the C5000 to read pulses from the GPIO board



Minimum Measured Quantity Coefficient – MUST be 1, 2 or 5

Minimum Measured Quantity Exponent – Must be a valid digit- see below

NOT USED

Air Settings
0 - Normally open – turn air switch ON for error
1 - Normally closed – turn air switch OFF for error

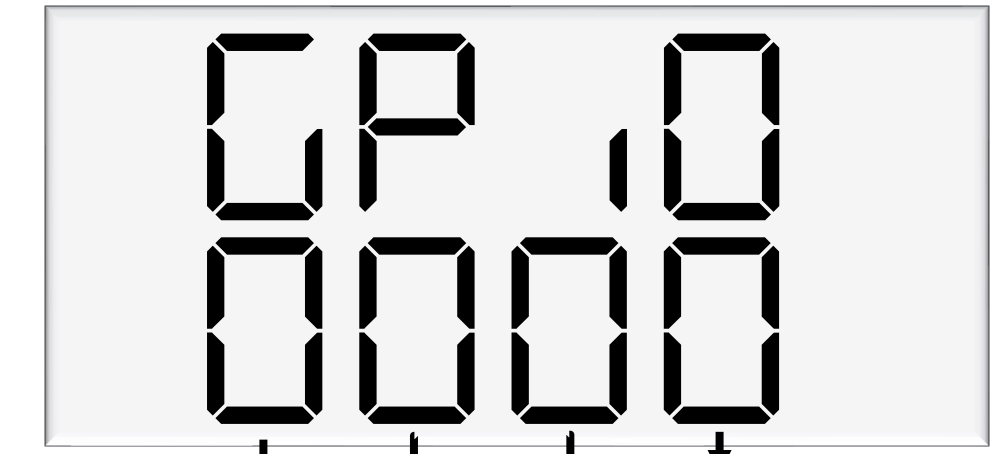
Meter Settings
1 - 1 Channel Encoder
2 - 2 Channel Encoder
3 - 3 Channel Encoder
4 - V50 Meter or KG Meter
5 - GPIO meter input

Variant Settings
0 - Non-LPG
4 - AdBlue (Diesel Emissions Fluid)
5 - LPG
6 - CNG

Quantity Settings (V50 Meter and KG meter Only)
0 - Litres Compensated
1 - Litres Uncompensated
2 - Mass (CNG only)

GPIO K Factor settings

The GPIO settings in the K factor board is where you set the GPIO specific settings. The below figure shows details of all the options available for each setting.



Duty Cycle Setting
0 - 50%
1 - 10%
2 - 20%
3 - 30%
4 - 40%
5 - 50%
6 - 60%
7 - 70%
8 - 80%
9 - 90%

Inputs Setting
0 - 1KHz
1 - 100Hz
2 - 200Hz
3 - 300Hz
4 - 400Hz
5 - 500Hz
6 - 600Hz
7 - 700Hz
8 - 800Hz
9 - 900Hz
A - 1KHz
b - 1.1KHz
c - 1.2KHz
d - 1.3KHz
e - 1.4KHz
d - 1.4KHz

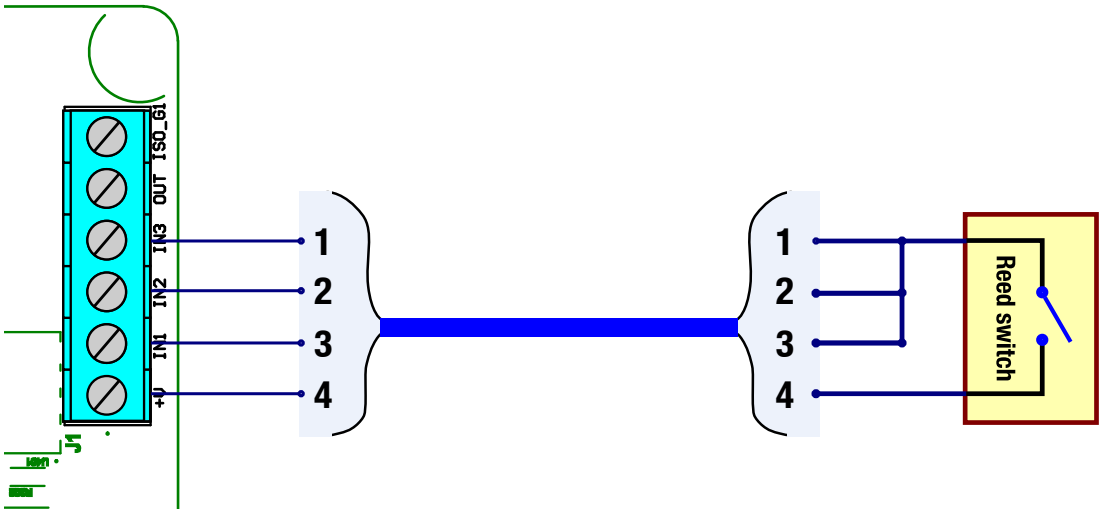
Inputs Setting
0 - 0 Off
1 - 1 Channel Encoder
2 - 2 Channel Encoder
3 - 3 Channel Encoder
4 - Switch Input

Output Settings
0 - 0 off
1 - Volume (Litres/Kg's)
2 - Amount (Dollars)

Third party meter wiring

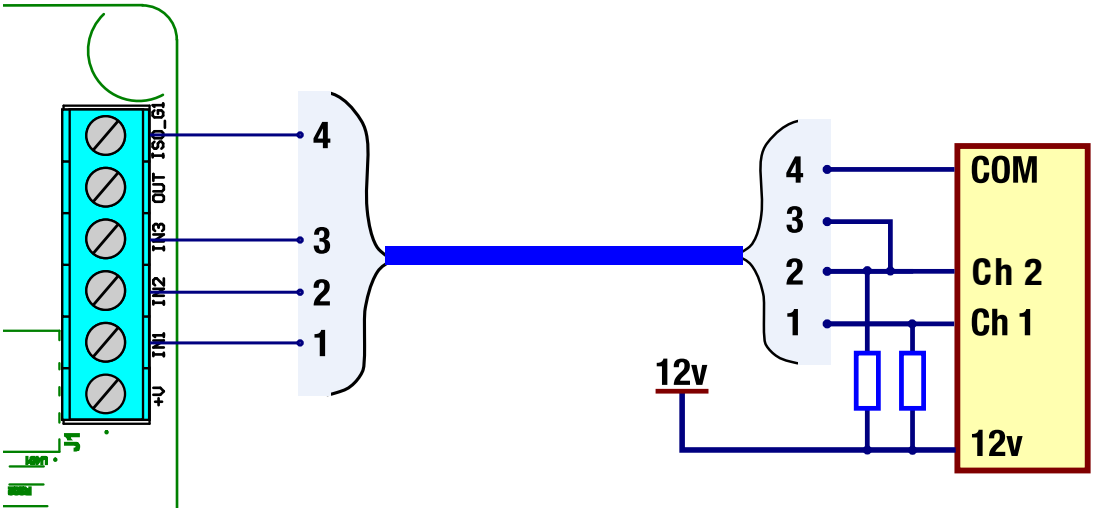
There are different types of meters with different numbers of channels. The below is the meter type and how to wire them to the GPIO Board.

When connecting to a reed switch type meter you connect the GPIO 5-volt to the reed switch and then all 3 inputs to the other terminal on the meter.



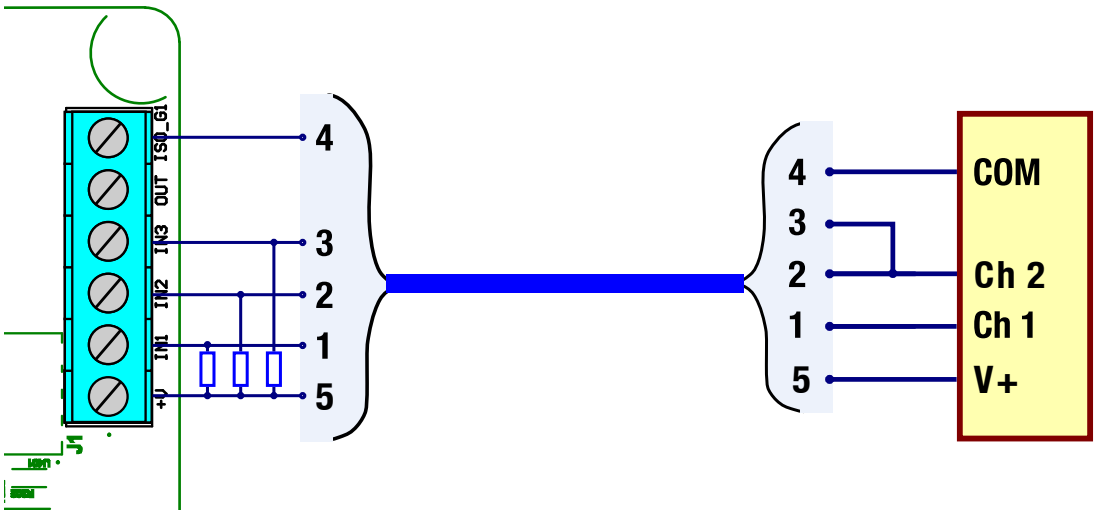
Single channel Reed Switch meter

The two Channel 12 volt meter is not powered from the GPIO Board, instead it is powered by its own power supply. Depending on the meter, pullup resistors may need to be added.



12-volt two channel meter

The 2 channel 5 volt meter is powered from the GPIO board. This means that the meter doesn't need power from an external source. Depending on the meter pullup resistors may need to be added. For 5 volts the pull up resister should be 820Ω



5 volt two Channel meter

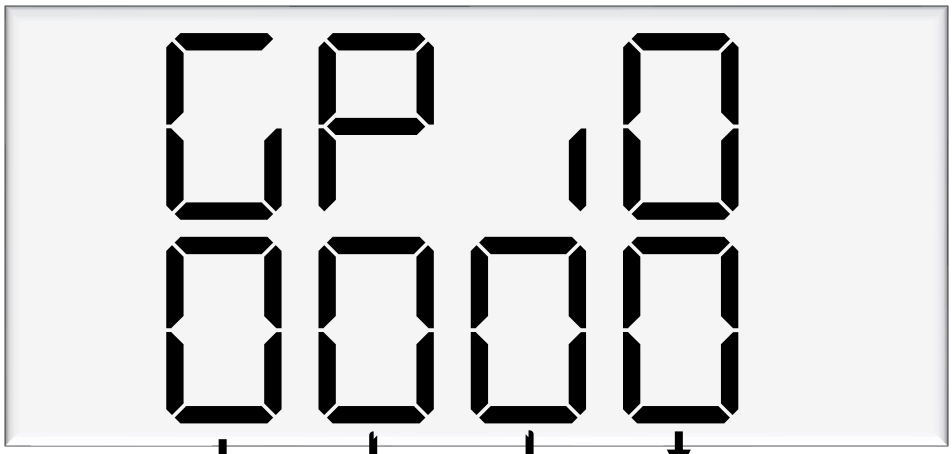
GPIO Input switch mode

Overview

The “Nozzle“ input is to act as a control allow or not allow the dispenser to be started. It is as if there is a switch in series with the real nozzle switch. with means that both nozzles need to be made for the dispenser to start

GPIO K Factor settings

The GPIO settings in the K factor board is where you set the GPIO specific settings. The below figure shows details of all the options available for each setting.



Duty Cycle Setting
0 - 50%
1 - 10%
2 - 20%
3 - 30%
4 - 40%
5 - 50%
6 - 60%
7 - 70%
8 - 80%
9 - 90%

Inputs Setting
0 - 1KHz
1 - 100Hz
2 - 200Hz
3 - 300Hz
4 - 400Hz
5 - 500Hz
6 - 600Hz
7 - 700Hz
8 - 800Hz
9 - 900Hz
A - 1KHz
b - 1.1KHz
c - 1.2KHz
d - 1.3KHz
c - 1.4KHz
d - 1.4KHz

Inputs Setting
0 - 0 Off
1 - 1 Channel Encoder
2 - 2 Channel Encoder
3 - 3 Channel Encoder
4 - Switch Input

Output Settings
0 - 0 off
1 - Volume (Litres/Kg's)
2 - Amount (Dollars)

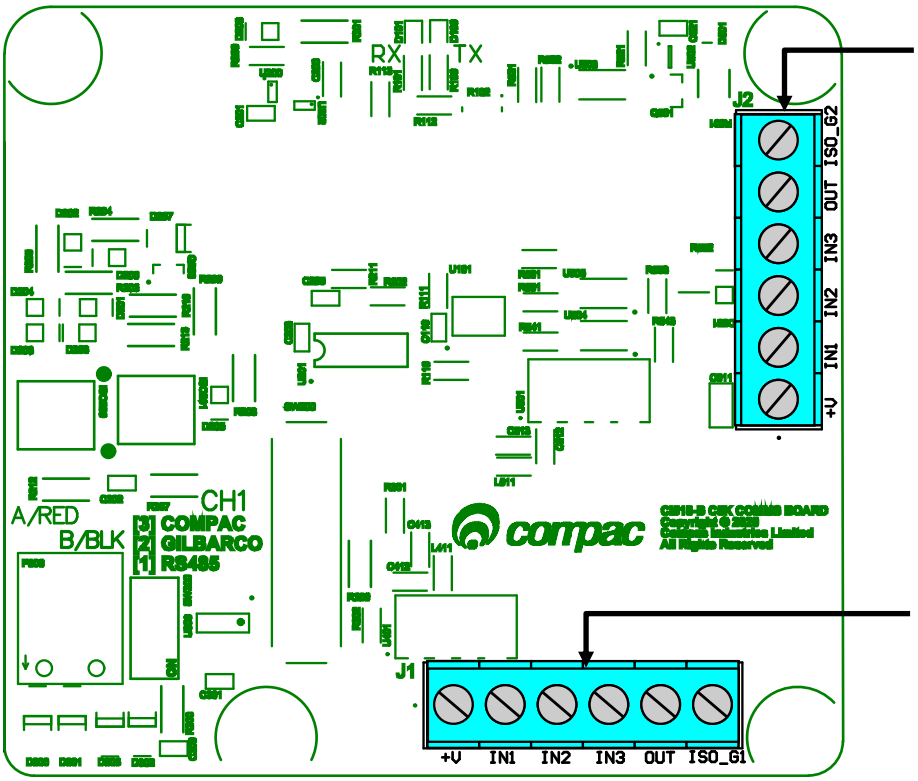
Input Switch Setting

The setting on the K Factor board to enable the “nozzle Switch“ is GPIO XXX4. When the switch input is enabled the dispenser will not start a transaction until the GPIO nozzle input is high and the nozzle input on the k factor board is high (lifted) as well.

Note that if the nozzle is lifted on the K-factor board and the GPIO Nozzle input is low (not shorted) the Diag LED on the K factor board won’t flash. In saying that if you want to troubleshoot the nozzle without the GPIO nozzle input you can disable the switch input by setting the GPIO setting to GPIO XXX0

Input switch Wiring

The GPIO nozzle input is wired in to the GPIO board in the flameproof box. The below figure shows the GPIO board and the location of the connectors.



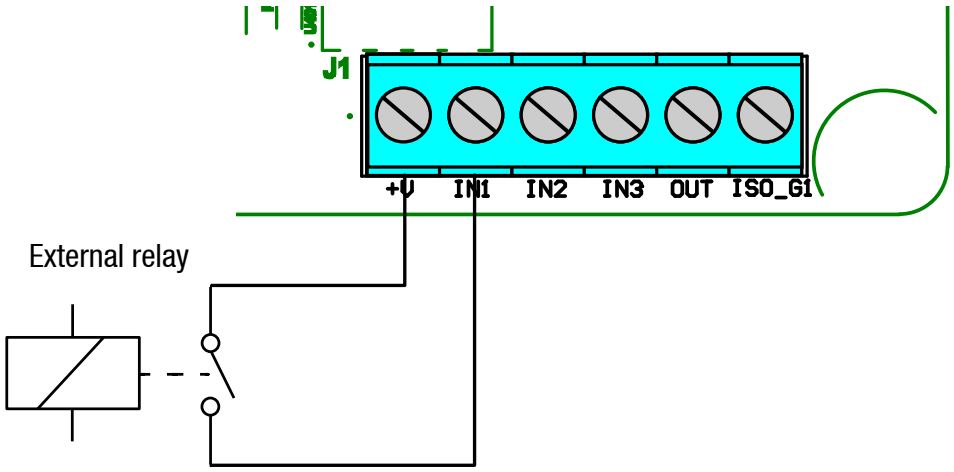
Side B GPIO connections

Side A GPIO connections

There are different ways to connect the GPIO Nozzle input to an external device and the specific way will depend on the application

Relay switch wiring

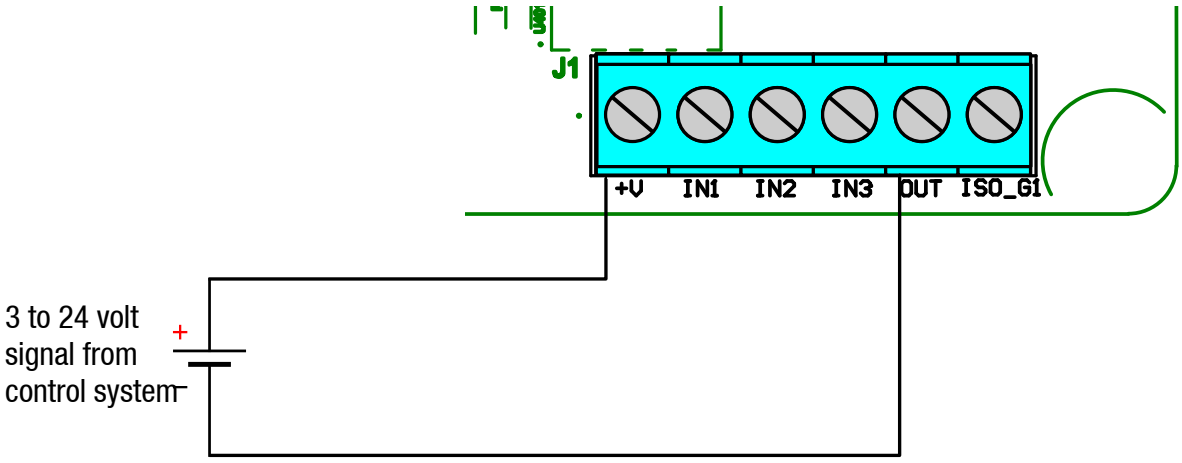
In this application an external relay is used to enable the GPIO nozzle input. 5 volts from the +V is fed into the relay and the output of the relay feeds back into the GPIO board via the IN1 terminal as shown below. This means that when the relay is energized the GPIO is pulled high enabling the nozzle. Use a relay means you can use any voltage AC or DC you just have to source the correct relay for your application



External DC Voltage

In this application an external DC voltage is applied to enable the GPIO nozzle input. This DC voltage can be between 3 to 50 volts DC. The ISO_G1 is connected to the Ground connection of the DC voltage source and the Positive side is connected to IN1.

Note that in the figure below the DC voltage sauce can be from a control system i.e. PLC



GPIO Pulse Output

Overview

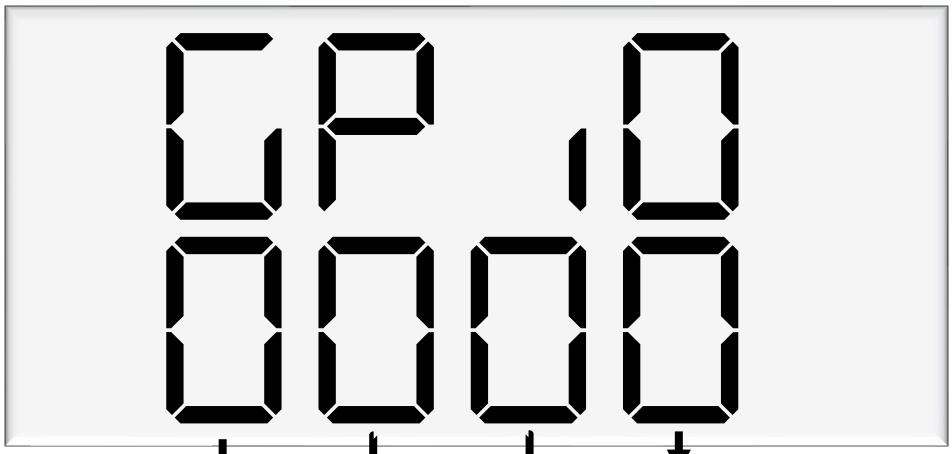
The Pulse output is designed to interface the Compac dispenser to a 3 party Controller/POS without the need to talk a communication protocol.

The Pulse output has the following parameters that can be changed

- Frequency
- Duty Cycle
- Output pulses for volume or amount
- The Value of a pulse

GPIO K Factor settings

The GPIO settings in the K factor board is where you set the GPIO specific settings. The below figure shows details of all the options available for each setting.



Duty Cycle Setting
0 - 50%
1 - 10%
2 - 20%
3 - 30%
4 - 40%
5 - 50%
6 - 60%
7 - 70%
8 - 80%
9 - 90%

Inputs Setting
0 - 1KHz
1 - 100Hz
2 - 200Hz
3 - 300Hz
4 - 400Hz
5 - 500Hz
6 - 600Hz
7 - 700Hz
8 - 800Hz
9 - 900Hz
A - 1KHz
b - 1.1KHz
c - 1.2KHz
d - 1.3KHz
c - 1.4KHz
d - 1.4KHz

Inputs Setting
0 - 0 Off
1 - 1 Channel Encoder
2 - 2 Channel Encoder
3 - 3 Channel Encoder
4 - Switch Input

Output Settings
0 - 0 off
1 - Volume (Litres/Kg's)
2 - Amount (Dollars)

Output

The output setting enables the GPIO board to output pulses. It also sets whether the output pulses are representing volume(litre/Kg's) or amount(dollars). Majority of applications will set the pulses to represent volume

Note you cannot have meter input enabled at the same time.

Frequency

The Frequency output setting sets the maximum speed of the output pulses. The Default setting of 0 sets the frequency to 1KHz. This setting combined with the Value per pulse setting sets the maximum flow rate of the dispenser.

Example

Frequency set to 1KHz (1000 pulses/sec)
Pulses per value are set to 00001 (10ml/pulse)

That means the maximum flow rate the dispenser can do before the output pulses lag behind is

$$maximum\ flow = maxium\ frequency\ \times\ pulses\ per\ value$$
$$maximum\ flow = 1000Hz\ \times\ 10ml$$
$$maximum\ flow = 10000\ ml\ per\ second$$
$$maximum\ flow = 600\ l\ per\ minute$$

The default setting of 1KHz should be sufficient for most applications. In applications where the maximum flow rate is lower and the 3rd party controller is only able to read pulses at a lower frequency then a lower frequency output can be selected.

Note that if the flow rate exceeds the maximum pulse output the next transaction will not be allowed until the pulses have completed being outputted.

Duty Cycle

The duty cycle setting gives the ability to set the percentage of the pulse high and low. The default setting is 50%. The pulse length is determined by the following formula.

Example

Duty cycle set to 50%
Frequency set to 1KHz (1000 pulses/sec)

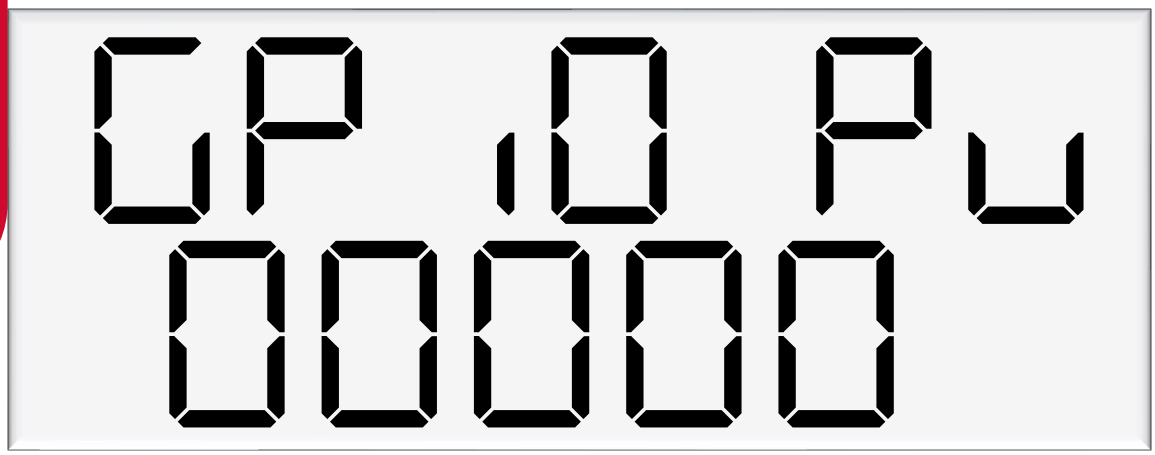
$$Duty\ Cycle = Pulse\ Width\ (sec) \times Frequency\ (Hz) \times 100$$
$$50 = Pulse\ Width\ (sec)\ \times 1000 \times 100$$
$$\frac{50}{100} = Pulse\ Width\ (sec)\ \times 1000$$
$$\frac{0.5}{1000} = Pulse\ Width\ (sec)$$
$$500\ microseconds = Pulse\ Width\ (sec)$$

The Default setting of 50% should be sufficient for most applications.

Pulse value

The pulse value setting sets what a pulse is worth. When the output is set to volume the lowest volume a pulse can be set to is 00001 which is 0.1 ml. If the output is set to amount the lowest amount a pulse can be set to is 00001 which is 0.0001 dollars.

The most common setting for most applications would be 00100 or a factor of 10. Any other setting would cause an error with rounding.



Hydraulic System

Hydraulic Cycle

On pump models liquid fuel is sucked up from the inlet into the suction pump, pushed upwards into the rotary COM meter where it is measured, and then pushed through a solenoid to the outlet. The solenoid controls the flow of fuel by opening and closing, and where a preset is fitted, switching from high to low-flow mode.

On a dispenser, liquid fuel is forced upwards through the inlet, through a strainer/filter, and then out through the meter, solenoid and outlet.

Below are the layout diagrams for our generic pumps and dispensers.

Hydraulic Components

Component	Function
COM50/125/250 Meter	Rotary meter designed to measure the flow of liquid fuel through it.
Filter/Strainer	Stainless steel mesh strainer, or filter to remove debris before the solenoid valve.
Solenoid	Provides on/off and flow control over fuel through the dispenser.
Breakaway	Fitted to the hose to allow a vehicle to accidentally drive off with the hose still attached to the vehicle without damaging the dispenser.

Safety Features

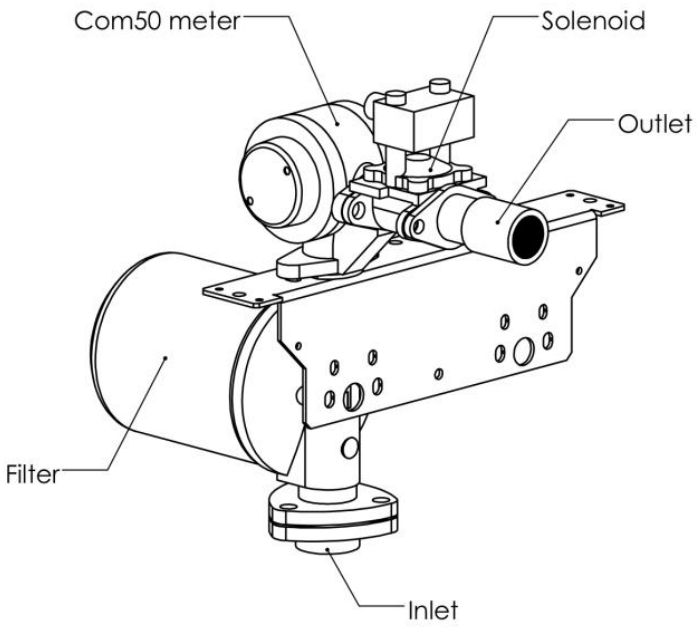
Situation	Feature	Description
Drive away with the nozzle attached to the vehicle.	Inline Breakaway	The Breakaway separates and the vehicle drives away with some of the hose attached to the vehicle. Flow is stopped from both ends of the hose. The Breakaway can be reassembled without tools.
The nozzle switch is left open while there is no flow.	No flow time out of 30 seconds.	The solenoids and pump motor are turned off after the stated time. This is settable from 0-254 seconds at commissioning. It is normally set to 30 seconds.

Hydraulic Layout

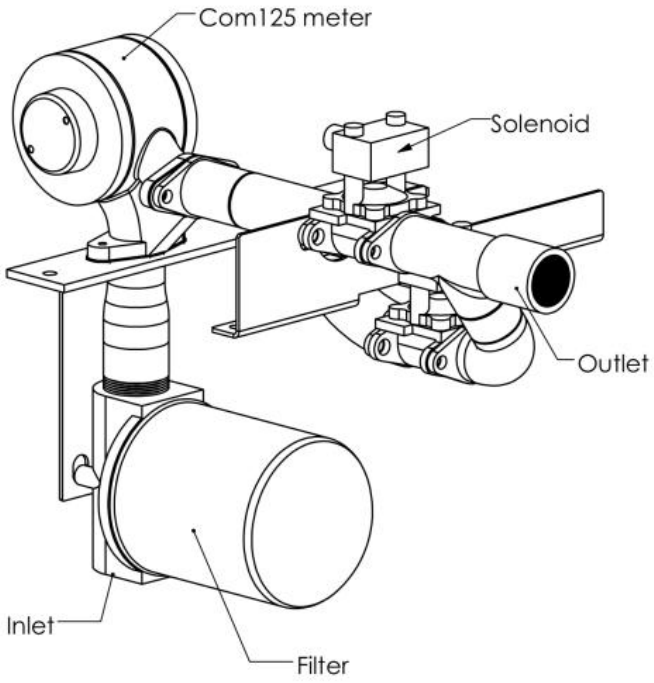
Single Dispenser

NOTE: *The following diagrams are not applicable to every unit. Please refer to the diagram specific to your unit. Some orientations and pipework may change during production and development, but the hydraulic system will stay the same.*

40 or 80L/min

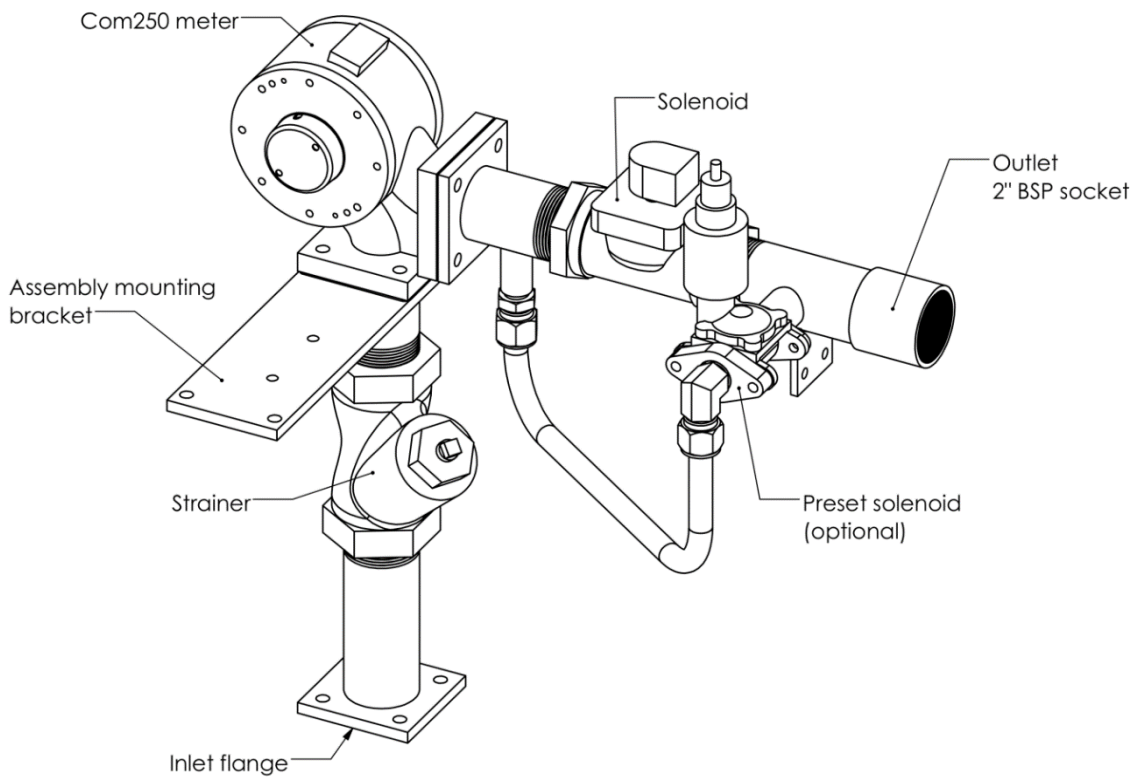


60L/min



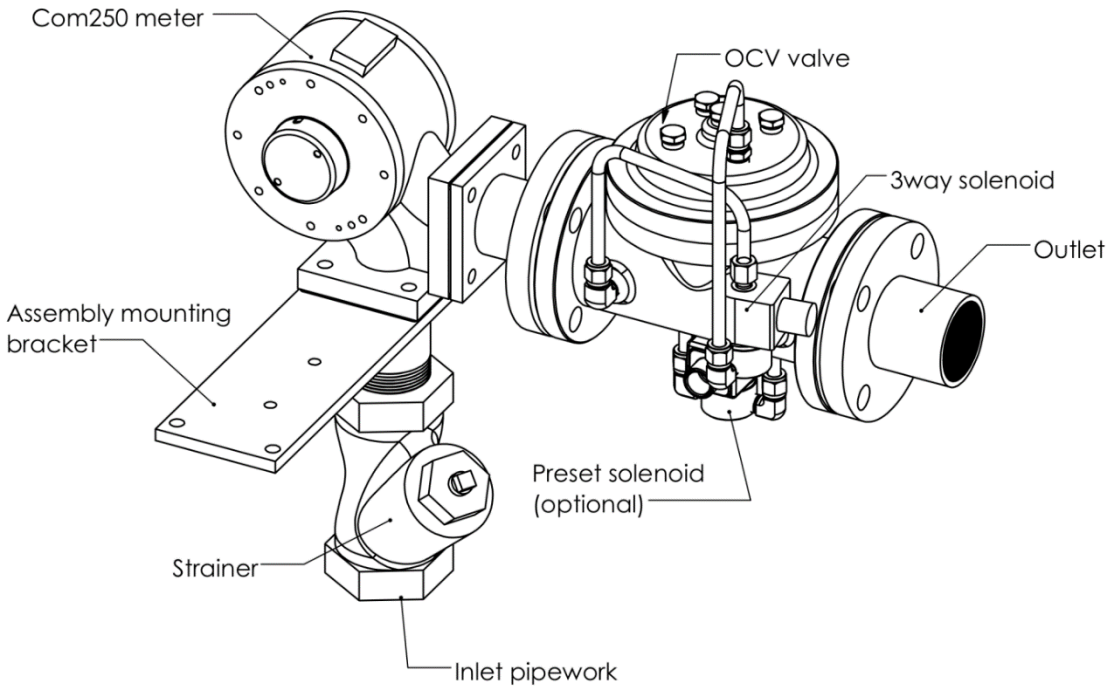
Single High Flowrate Dispenser

Standard 400L/min



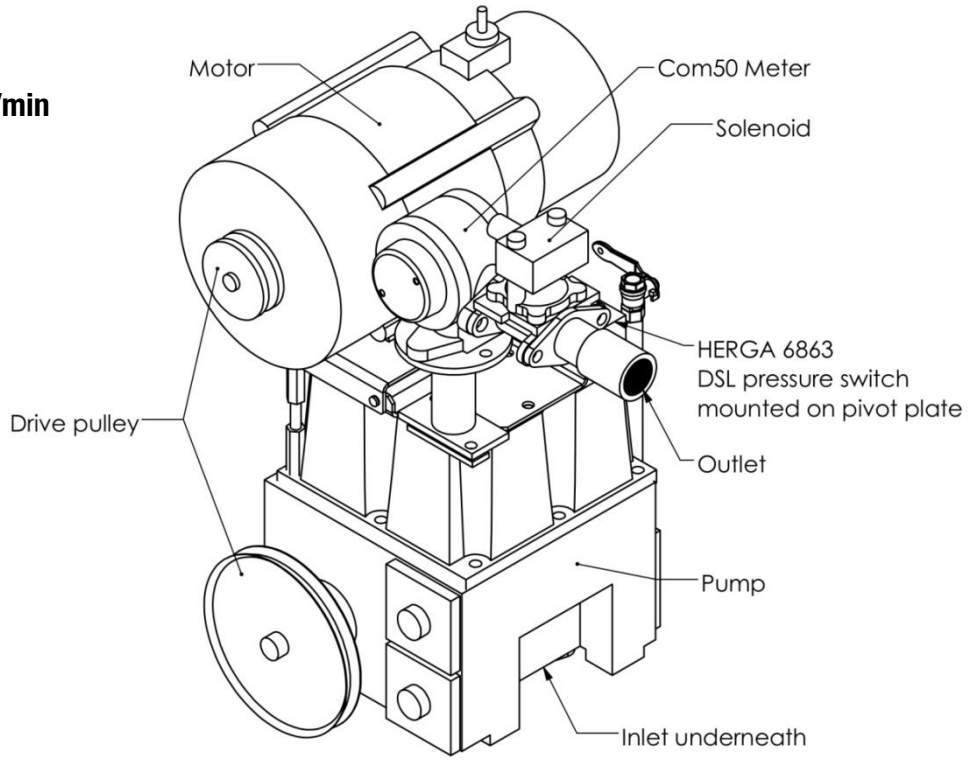
Single Aviation Dispenser

400 L/min with OCV valves

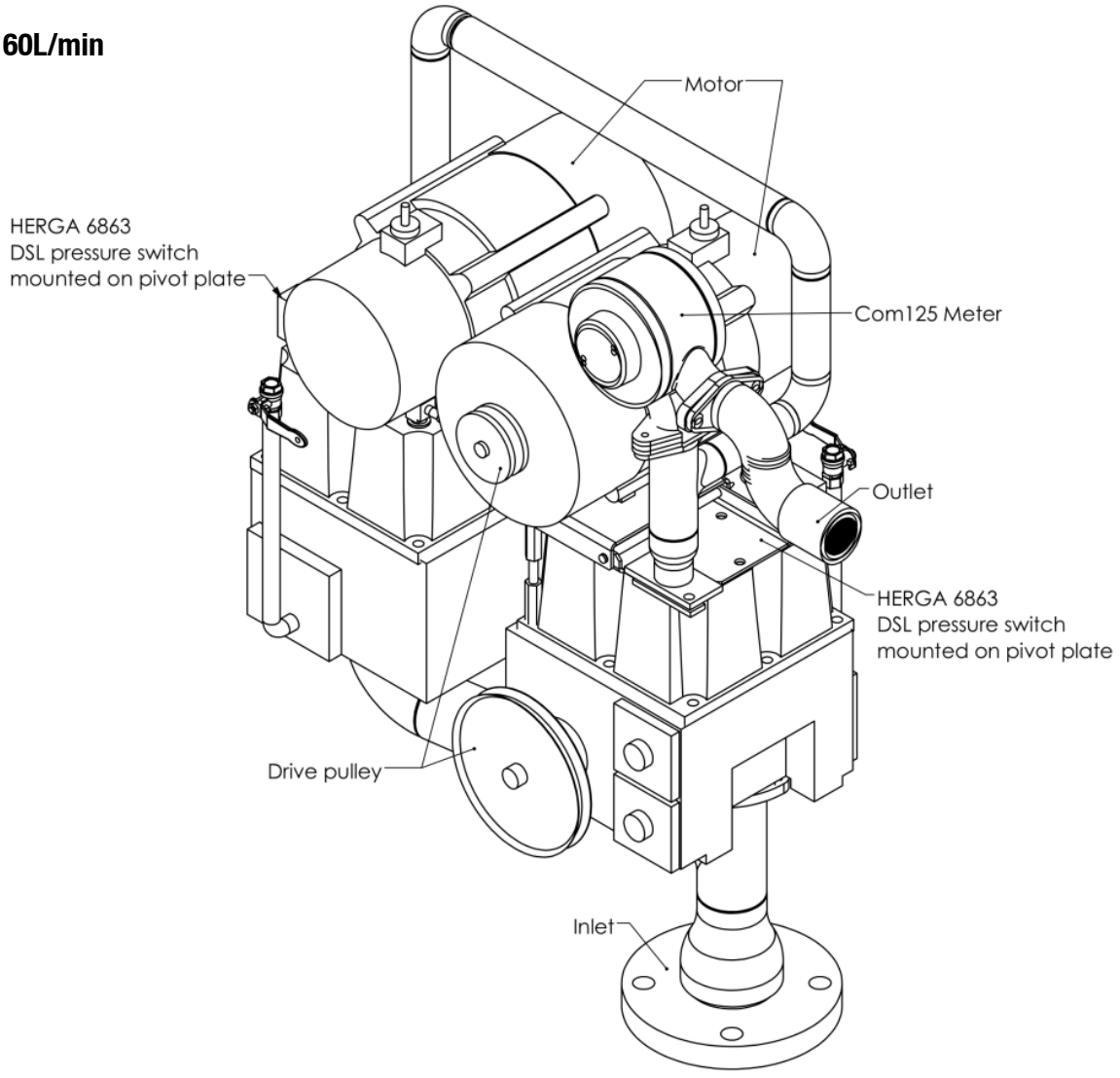


Single Pump

40 or 80L/min

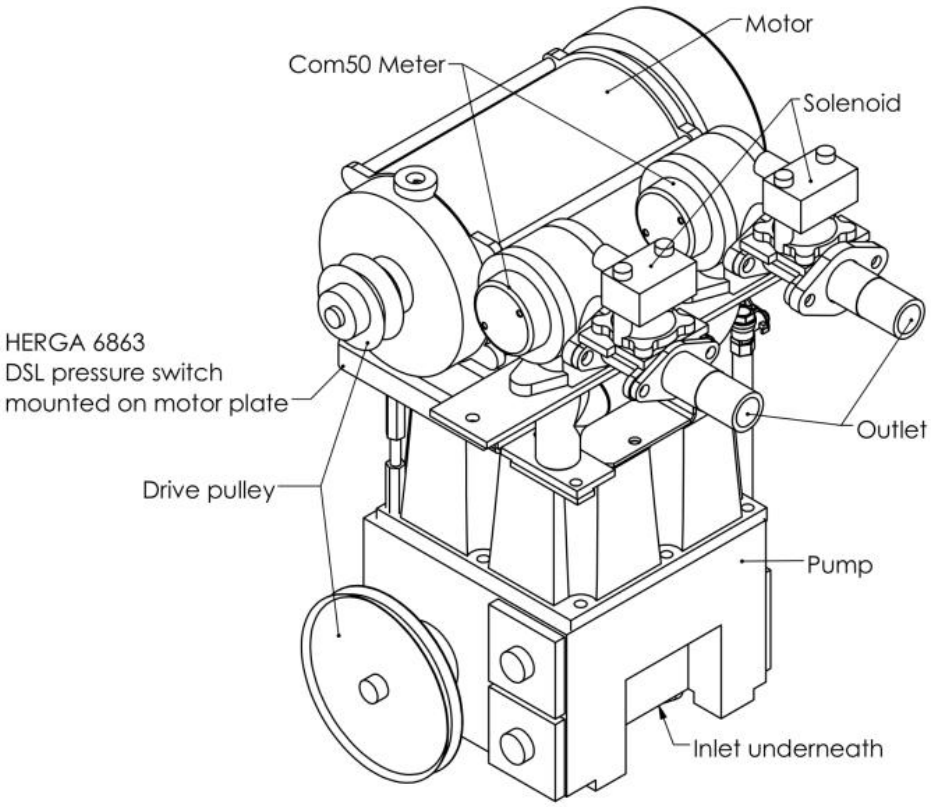


160L/min



Duo Pump

40L/min



Service

Maintenance Schedule

NOTE: *The following times are ideal. The scheduled times may change depending on the site, the quality of fuel, and other factors. As an example, the filter may need to be cleaned more frequently on sites with lower quality fuel.*

Maintenance operation	Weekly	Monthly	6 Months	12 Months
Check the pump/dispenser panels and fascia for any sign of physical damage or missing parts, screws etc. Arrange a service agent to fit replacement parts where required	x	x	x	x
Record the electromechanical and electronic tote	x	x	x	x
Run a cleaning card with cleaning fluid on it through the card reader (If fitted). This may need to be carried out daily on high-use sites or sites in areas with a lot of dust present		x	x	x
Check the operation of the card reader with a test card		x	x	x
Clean the display fascia		x	x	x
Clean the pump/dispenser panels		x	x	x
Inspect the refuelling hose, breakaway and nozzle for damage. Replace if required		x	x	x
Check the operation of the nozzle switch		x	x	x
Perform a test transaction and check the printed receipt is legible. Check the printer paper roll and replace if it has less than 10mm of paper remaining on the reel measured from the side of the roll		x	x	x
Check all the wiring terminations are tight, the K factor seal is in place			x	x
Conduct a segment test using the parameter button and check display for shorts / corrosion etc			x	x

Maintenance operation	Weekly	Monthly	6 Months	12 Months
Check there is no moisture or water inside the cabinet, also check the sump for water and pump out if necessary			x	x
Run a test fill and check the calibration and flow rate. If the flow rate is low, investigate and change the filter if required			x	x
Inspect the pump / dispenser for fuel leaks			x	x
Check that the motor belt is correctly tensioned, and it is not worn or frayed			x	x
Check the mains and non-intrinsically safe cables for damage or bare wires and that explosion-proof glands are in place where required				x
Visually check that no non-standard modifications have been made to the wiring within the dispenser				x
Change or clean the filter (If fitted)				x
Check that the lids are fitted to explosion proof and vapour proof enclosures and that all lid fixing screws, bolts and seals are in place				x

Circuit Boards

Removing or replacing the electronics inside the unit is a simple process. The boards can simply be unscrewed and gently removed, taking care not to damage the pins holding the boards in place. The terminal board and processor board, located on the top of the flameproof box, can also be removed and replaced with care.

CAUTION:

Ensure the unit is isolated before attempting to replace or remove any electronics.

Before removing or replacing boards, it is important to note the following:

- The processor board stores all data and transactions for the unit. A memory dump should be retrieved before replacing this board, otherwise all data will be lost. Contact Compac to retrieve this.

- The processor board decides the device ID. If this is replaced, the unit will have a different device ID. The unit's device ID should be changed from the unit (refer Software Setup on page 12.) This will change the CompacOnsite website.
- The K-Factor board is located on the display. In most cases, the display and K-Factor board will be replaced as one part. If the display is changed and the original K-Factor board is refitted, or the K-Factor board is removed separately, it will lock and it will be a few hours before it is operational again. New K-Factor boards are operational immediately.
- If the K-Factor board is replaced, press and hold the parameter button and press the K-Factor button once to transfer the old settings to the new K-Factor board.
- If the processor board is replaced, press the K-Factor button once to transfer settings to the processor board.

Adjusting Drive Belt Tension

Fuel dispensers fitted with internal pumps use a drive belt to transmit power from the electric motor to the pump. The belt is relatively maintenance free but may require adjustment if it is slipping or has been replaced.

If the belt is slipping, it will squeal when under load. Before adjusting, check the following:

- Is the belt cracked or fraying?
- Is the belt worn?
- Are the sides or bottom of the belt glazed?
- Are the pulleys damaged or worn?

If the belt shows any of the above signs it should be replaced and tensioned.

Use the following procedure to adjust the belt tension:

- Loosen off the drive belt adjusting bolt until the belt is slack.
- Tighten the belt just enough to stop slipping and the belt deflects approximately 10 mm to 12 mm when lightly pushed. It is better to have the belt too loose rather than too tight.
- Tighten the locking nut.
- Run the pump under load and check for slippage.
- For new belts, run the belt in for 10 minutes or so and recheck the tension.

You can check the current draw of the motor; it should be 5 amps or less when under load.

CAUTION:

Over tensioning the drive belt may cause the following:

- Motor overheating
- Motor and pump bearing wear
- Excess belt wear

LED Diagnostics

LEDs on the circuit boards can be used to diagnose faults in the unit. View the LEDs and their corresponding tables to see the state of the board.

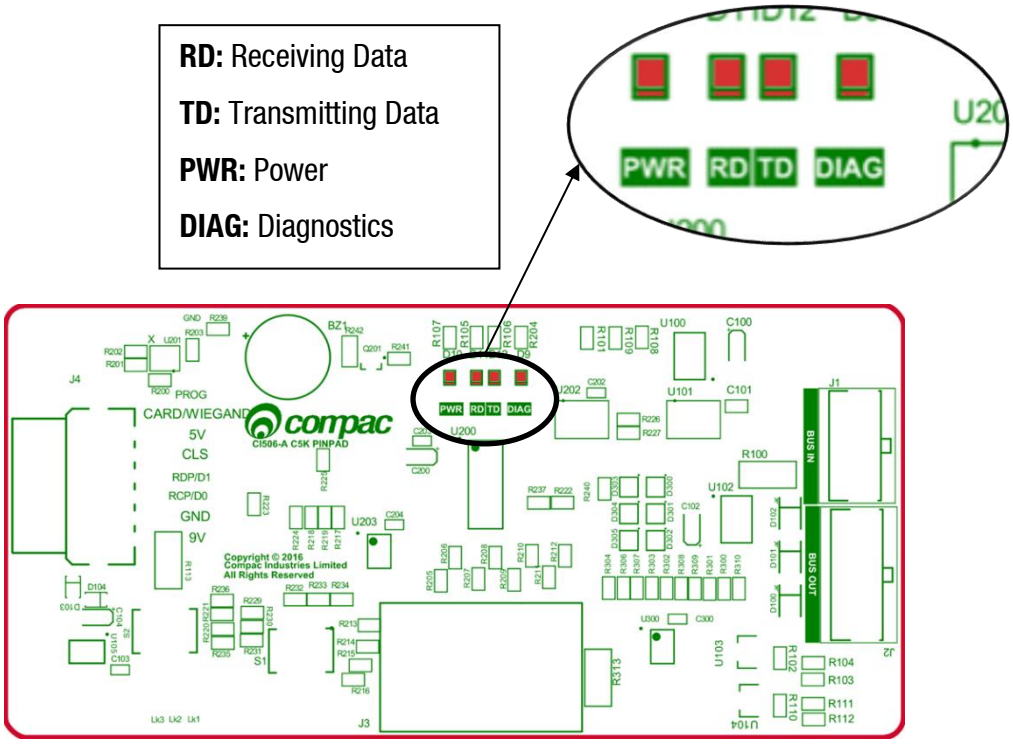
PIN Pad Board

RD: Receiving Data

TD: Transmitting Data

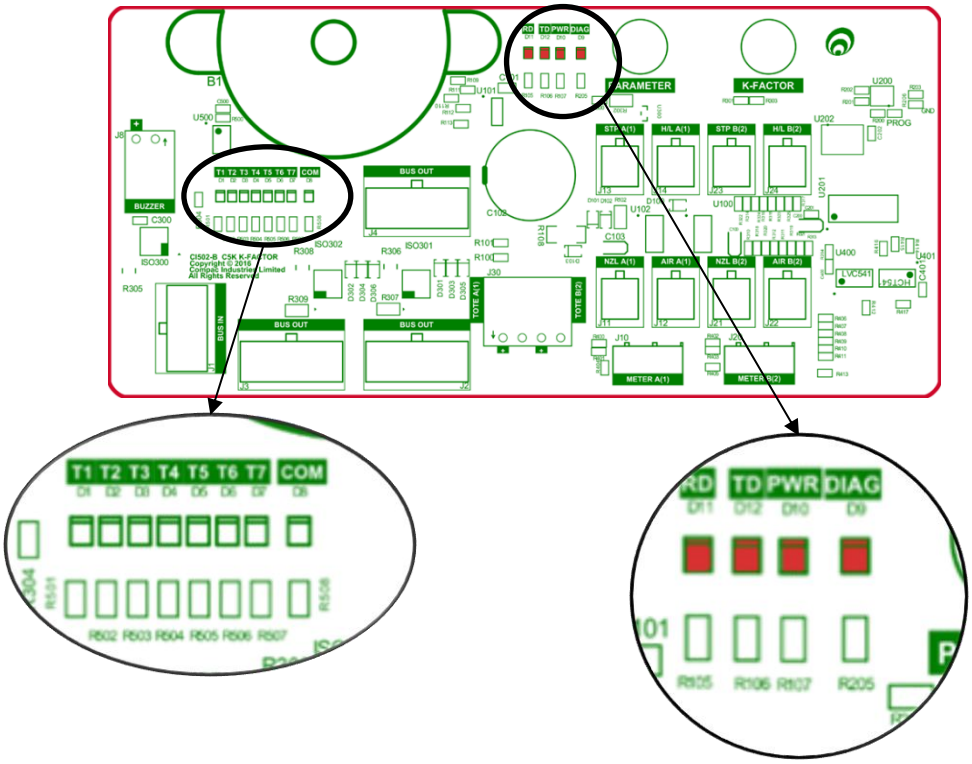
PWR: Power

DIAG: Diagnostics



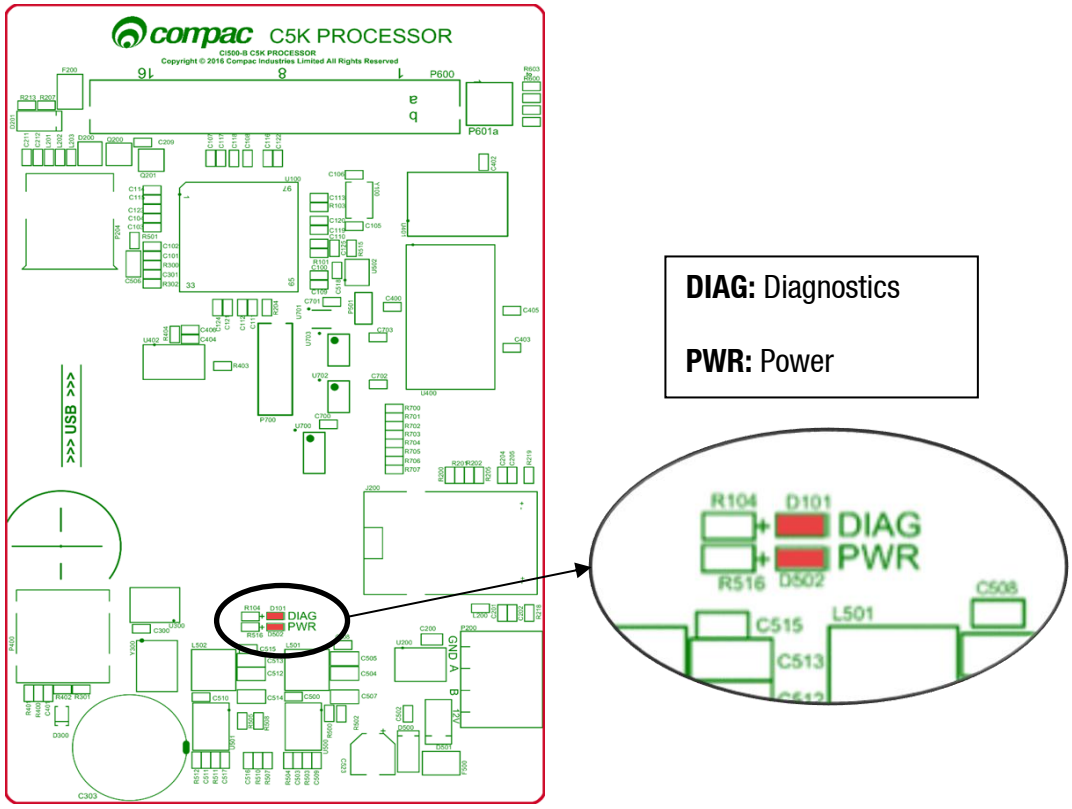
Processor Board LEDs	Operation/Possible Cause
Power	This should be on when there is power to the unit.
Diagnostics	This should be on whenever the power LED is on.
Transmitting data/ Receiving data	In normal operation, these should be on when the Diagnostics light is on, and off when the diagnostics light is off. If the diagnostics light is on, and the TD/RD LEDs are off, this means these is an error. This could be due to cabling – check the bus system cables.

K-Factor Board



K-Factor Board LEDs	Operation/Possible Cause		
Power **(PWR)**	This should be on when there is power to the unit.		
Diagnostics **(DIAG)**	In normal operation, this should flash slowly, and then flash quickly when the nozzle switch is lifted.		
Output LEDs **(T1-7)**	These LEDs correspond to side A and B motors and solenoids. They will light up according to the hardware they represent. These outputs change depending on the configuration of the unit.		
	Single: T1: Side A motor T2, T3: Side A solenoids T4, T7: Side A high flow solenoids T5, T6: Not used	**Dual:** T1: Side A motor T2, T3: Side A solenoids T4: Side B motor T5, T6: Side B solenoids T7: Side A high flow solenoid	**Dual 160:** T1: Sides A & B motor T2, T3: Side A solenoids T4: Side B high flow solenoid T5, T6: Side B solenoids T7: Side A high flow solenoids
Receiving data/ Transmitting data **(RD/TD)**	In normal operation, these should be on when the Diagnostics light is on, and off when the diagnostics light is off. If the diagnostics light is on, and the TD/RD LEDs are off, this means these is an error. This could be due to cabling – check the bus system cables.		

Processor Board



DIAG: Diagnostics

PWR: Power

Processor Board LEDs	Operation/Possible Cause
Power	This should be on when there is power to the unit.
Diagnostics	This LED shows whether the firmware is running for the board. If it is off, the firmware is not running, and if it is on, it is running. Upon start up this LED will flash, indicating the firmware is loading. The flashing may last up to a minute before it stabilises to being constantly on. If the flashing lasts longer, the board is in bootloader mode – this means that the firmware has crashed, or not loaded correctly.

Modem LEDs

The Fillmaster comes with a Comset modem, which has indicating LEDs to display the status of the modem. Refer to the accompanying table to understand the modem LEDs.

LEDs shown here.
Order is as follows:

- LAN
- WAN
- WIFI
- CELL
- Signal
- VPN
- SYS

LED	Indication Light	Description
SYS	On for 25 seconds	On for 25 seconds after power up
	Blinking	System set-up normally
	Off or still on after 25 seconds	System set-up failure
LAN	Blinking	Ethernet data transmission
	Off	No Ethernet connection
	On	Ethernet is connected
VPN	On	VPN tunnel set-up
	Off	VPN tunnel not set-up or VPN failure
CELL	On	Cell connection is 'UP' and now you have access to the Internet
WIFI	On	WiFi enabled
	Off	WiFi disabled
WAN	Blinking	Ethernet data transmission
	Off	No Ethernet connection
	On	Ethernet is connected
Signal	Off	No signal, or signal checking is not ready
	Blinks once every 4s	Signal bar is 1
	Blinks once every 3s	Signal bar is 2
	Blinks once every 2s	Signal bar is 3
	Blinks once every 1s	Signal bar is 4
	Blinks twice every1s	Signal bar is 5

Troubleshooting

Electrical

No Power

- Check power to dispenser/pump unit.
- Check Power LED on processor board.
- Check connections.
- If Power LED is off, check for a short on intrinsic devices by unplugging each device until the Power LED lights up.
- Check Power Supply fuses.
- Replace C5000 if fault not found.

Pump Cuts Out

- Check end of sale indicator in the pump number setting on the parameter switch to determine what ended the fill.
- Check Diagnostics LED on the processor board to see if there is a software issue.
- If Diagnostic LED is off, check that memory chips are firmly in their sockets.
- Replace C5000 if LED is on after repowering unit.

Pump Not Starting

- Check Triac fuse.
- Check all pump motor connections.
- Check pump motor.
- Check wiring.
- Select a spare High Current Solid State Relay if the above checks are okay.
- On the K-Factor board, if the output LEDs are off, check nozzle switch, the nozzle switch is working if the Diagnostic LED flashes faster when switch is on.
- Check Display connection.
- Replace C5000 if fault not found.

Pump Not Stopping

- Check nozzle switches are releasing, the nozzle switches are working if the Diagnostic LED on the K-Factor board flashes faster when switch is on.
- If Output LEDs are off, select a spare High Current Solid State Relay.
- Replace C5000 PCB if fault not found.

Solenoid Not Energising

- Check Triac fuse.
- Check all Solenoid connections.
- Check Solenoid.
- If output LEDs on the K-Factor board are off, check nozzle switch operation, the nozzle switches are working if the Diagnostic LED flashes faster when switch is on.
- Select a spare Low Current Solid State Relay if the above checks are okay.
- Replace C5000 if fault not found.

Solenoid Not De-energising

- If output LEDs on the K-Factor board are on, check nozzle switch is releasing, the nozzle switch is working if the Diagnostic LED flashes faster when switch is on.
- Select spare Low Current Solid State Relay.
- Replace C5000 if fault not found.

Preset Display Digit Flashing

- Check if any preset buttons are stuck in.
- Check wiring & condition of display plugs.
- Replace if fault not found.

PIN Pad Not Working

- Check that the unit is communicating with the controller using the RD/TD LEDs.
- Check connectors are fitted correctly and free of dust.
- Replace if fault not found.

Mechanical

Pre-Set Overrun

- Solenoid blocked and cannot close or has a damaged piston.
- Solenoid coil wired incorrectly. Check solenoid orientation.
- P-cut setting too low. Adjust P-Cut setting.

Calibration Problems

- Check that configuration is correct for calibration method - i.e., temperature compensation on or off.
- Check that filter is not dirty.

Solenoid Valve Not Opening

- Check the output LEDs on the K-Factor board.
- Check the electrical supply to the coil. Check the C5000 output triac is switched on. There should be 220 – 240 volts across the solenoid coil.
- Put power on the solenoid and hold a screwdriver above the coil to feel the magnetic field pull. Because of the construction of the coil a resistance reading cannot be obtained.

C5000 Pumps and Dispensers

Error Codes & End of Sale (EOS) Messages

Version 1.0.0

9 April 2025

C5000 Error codes

These are all the Error codes available in the C5000. Some are product specific so will not be found in all applications.

Error Code	Product specific	Likely cause	Suggested action
Er 3 Err 3	No	1. Price is not set in the Dispenser 2. Pump number is not set in the Dispenser	1. If the dispenser is connected to a site Controller, the price on the dispenser should be set to 0.00 and the pricing should be sent from the Controller. If the dispenser is not connected to a site Controller, the price must be set on the dispenser. 2. Set the hose number in the dispenser
Er 8 Err 8	No	Excessive Reverse flow	Check that product is not flowing back into the tank once the delivery has finished. This can occur if the non-return valves on site are leaking
Er 9 Err 9	No	The Flow Meter is in an illegal error state	Re-power the Dispenser. Check Meter cable for loose wires or bad connections Replace the Meter or the Encoder board on the Meter
Err 91	No	Meter sequence error	If 3rd Party Meter, check the wiring
Er 10 Err 10	No	Memory error Configuration data lost or corrupted	Re-configure Dispenser If problem persists, replace Memory / Processor Board
Er 12	No	Display Error	Replace Display

Err 12			
Err 13	No	Slave board has restarted	Power failure Hardware failure
Err 14	No	K Factor Board offline	Check the Bus connections and C5K Power Supply
Err 15	No	K Factor board has restarted	Power failure Hardware failure
Err 16	No	K Factor board is not talking to the LCD Display	Check wiring Replace K Factor board or LCD Display
Err 31	No	Transaction has ended but fuel is still flowing	Solenoid leaking
Er 41 Err 41	No	Pump not communicating with Controller	1. If only one pump on the site is not communicating with the Controller, then the fault is likely to be in the pump a. Check the comms wire connections on the comms board b. Check the Diagnostic LEDs on the Comms board in the Dispenser to diagnose cause c. Check the configuration and setup in the Dispenser 2. If all pumps on Check the comms wire connections on the comms board a. Check comms cables between the Dispenser and the Controller b. Check setup and operation of the Controller
Er 50	No	Meter not communicating with Dispenser electronics	Check Meter connections Check Dispenser configuration Check that the Meter ID setup in the configuration matches the Meter ID
Er 52	No	Meter error	If the problem persists after repowering the unit, replace the meter.
Er 53	LPG Adblue / DEF CNG	Meter stopped vibrating	Repower the unit. This error might display when the dispenser is powered up. In this case it is normal. If the problem persists, replace the meter
Er 54	No	Temperature sensor failure	Repower the unit. If the problem persists, replace the meter
Er 55	CNG	Meter not ready.	Wait for meter to calibrate itself. The KG100 meter is in startup mode. If the problem persists, repower the unit.
Er 61	LPG Adblue / DEF CNG	Error 61 happens because the Meter was not able to zero	This can be due to a leak in the line or crystals accumulated in the Meter. Check for leaks /crystallization Purge the line.

			If that does not reset the Error 61, pull the Meter out and pour hot water on it to dissolve any crystals inside the Meter. If the problem persists, Replace the meter.
Er 62	LPG Adblue / DEF CNG	Meter could not reset the batch (Could not zero the transaction values when nozzle was lifted to start a new transaction)	Try restarting the Meter. If the problem persists, Replace the meter.
Er 71	LPG Adblue / DEF	V50 meter is set but variant is not selected	Configure Device to either AdBlue / DEF or LPG
Abd		Display offline / Display Fault	Check the connections to all displays, Check the configuration of the slave boards (If slave displays are connected) Check and/or replace the display
cnG 157	CNG	The Dispenser expected no flow. Potential Solenoid Valve leak	Repair / rekit Solenoid
cnG 158	CNG	Tank volume predictor uncertainty	Check for leaks in the Dispenser's hose or fittings
cnG 159	CNG	Temperature Probe out of range	Re-calibrate Temperature Probe
cnG 160	CNG	Pressure Probe alignment error. There is more than 10bar difference between the two probes	Re-calibrate Pressure Probes (Dispensers with two Pressure Probes per hose)
cnG 161	CNG	Temperature Compensation calculation is uncertain	
cnG 162	CNG	Generic CNG error with a number of potential causes	
cnG 164	CNG	Pressure Probe error	Check / replace / re-calibrate Pressure Probe.
cnG200	CNG	The Dispenser is detecting unauthorised flow	Gas is flowing without the Start switch having been pressed to start a fill
hoLd	No	There are two types of HOLD error 1. "Soft" HOLD error that resets after the unit is re-powered 2. "Hard" HOLD error that does not reset after the unit is re-powered May also show Error 14 on display	Re-power the unit. Does the HOLD error reset? 1. If the HOLD error resets but the problem persists, then the SD card may be corrupt and require replacement. Refer to the SD replacement procedure document. 2. If the HOLD error did not reset, then there is a possible hardware fault in the Power Supply PCB / Processor PCB board / K factor PCB board / other PCB board or Bus cable.
cAL ibc	No	K-Factor data integrity failure, or the processor board has been replaced	To reset, break the K factor switch seal and momentarily press
cAL ibP	No	The K-Factor board has been swapped/replaced	To reset, break the K factor switch seal and momentarily press
cAL ib	No	The unit needs calibration, usually due to a hardware change	Check the K-Factor, temperature and density calibration
cAL ibF	No	K-Factor is not set or is 00.0000	Calibrate the unit and set the K factor
A ir	No	1. Air is in the system. 2. Density out of range	Make sure pump is running. Check tank and pipework for leaks. Purge system.

		3. Coil amplitude too low while meter is operating, displayed until next sale is started	Increase the Solenoid delay on the K-Factor switch
orun	No	Preset amount Overrun – flow above preset	Check that solenoid is closing Increase the preset cutoff
SuMP	No	Sump error – liquid detected in the sump	Empty the sump. Check the dispenser for leaks Check for water etc getting into the sump.
GAS	LPG	For LPG, the density being returned from the meter is too low	Calibrate meter density using the K-Factor switch
AbdL	No	Display LCD error	There is a problem with the K Factor Board talking to the LCD Check cables, plugs etc If problem persists, replace K Factor board / LCD Display
Er FLo	No	Excess Flow	Maximum flow rate exceeded, Increase Maximum flow rate setting or restrict flow
Er PrSt	No	The preset entered is below the MMQ	Enter a preset above (or equal to) the MMQ
Er dEn	LPG	Density or Temperature out of Range	Calibrate meter density using the K-Factor switch Calibrate meter temperature using the K-Factor switch

C5000 END OF SALE (EOS) Indicators

The purpose of the END OF SALE Indicator to give the reason why the last fill ended.

Some END OF SALE Indicators are a result of a fault in the system.

Refer to “C5000 Master Manual” for detailed instructions on how to view the END OF SALE (EOS) Indicators for your product

Note: This is a complete list of all the available END OF SALE Indicators and covers all Compac products. Some END OF SALE Indicators are Product / Fuel type specific

Name	End of Sale EOS Code	String	Reason
END_UNKNOWN	0		EOS unknown
END_NOZZLE_HUNG_UP	1	"NOZ"	Nozzle hung up
END_PRESET_STOP	2	"PRESET"	Ended on the Preset
END_DISP	3	"DISP END"	Normal EOS
END_OFFLINE	4	"OFFLINE"	Device went offline
END_MAX	5	"MAX"	Max Value reached
END_AIR_CUT_OUT	6	"AIR"	Air in product
END_ERROR	7	"ERROR"	Refer Error table
END_CNG_SEQUENCE	8		Normal CNG specific EOS
END_SUMP	9	"SUMP"	Sump switch activated
END_TIMEOUT_NO_FLOW	10	"TO FLO"	No flow timeout
END_TIMEOUT_FILL	11	"TO FIL"	Timeout end of fill
END_TIMEOUT_AUTH	12	"TO ATH"	AUTH timed out
END_POR	13	"REPOWER"	Repowered
END_STOP_SWITCH	14	"STOP SW"	Stop switch activated
END_INVALID_PRESET	15	"PRST ERR"	Invalid Preset
END_DISPLAY_OFFLINE	17	"DIS OFFL"	Display offline
END_DISPLAY_UNPAIRED	18	"DIS PAIR"	Displays not paired
END_CONTROLLER_INITIATED_TERMINATE	30	"FMS TEM"	Controller initiated

END_CONTROLLER_INITIATED_CLOSE	31	"FMS CLO"	Controller initiated
END_METER_ERR	41	"MTR ERR"	Flow Meter Error
END_METER_ERR_REVERSE_FLOW	42	"REV FLO"	Reverse Flow
END_METER_ERR_EXCESS_FLOW	43	"EXC FLO"	Excess Flow
END_DENSITY_ERR	35	"DENSITY"	Density Error
END_TEMP_ERR	36	"TEMP"	Temperature Error
Codes below are CNG-Specific			
Reasons to stop before filling			
END_CNG_FIRST_MEASUREMENT_WITHIN_20_BAR_OF_TARGET	150	"PrW20B "	
END_CNG_MEASUREMENT_EXCEEDED_MAXIMUM_PRESSURE	151	"PR Emax"	
END_CNG_NO_FLOW_POSSIBLE	152	"NO FLOW"	
END_CNG_PREFILL_CHECK_ERROR	153		
Successful Reasons to stop fueling			
END_CNG_FILL_TARGET_MET	154	"TARG S"	Generic successful fill - Pressure must have been within tolerance during a bank pause event.
END_CNG_TARGET_PRESSURE_REACHED	155	"PGOAL S"	Stopped due to successful pressure target (crude or resistance-method derived)
END_CNG_TARGET_MASS_REACHED	156	"MGOAL S"	Stopped due to successful delivered mass target (compensated settled pressure)
END_CNG_LOW_FLOW_TIMEOUT	163	"LO FLOW"	Successful reason as there is nothing that can be done, or manually shut off by the operator
Unsuccessful **Reasons to stop fueling**			
END_CNG_LEAKING_SOLENOID	157	"SOL LK"	Flow detected after Line delay time + 1 second. Leaky solenoid or need to increase line delay.
END_CNG_VOLUME_FINDING_ERROR	158	"VOLc ER"	Stopped 4 times and has dispensed

			4kg trying to calculate volume
END_CNG_TEMPERATURE_PROBE_CALIBRATION_ERROR	159	"T CalE"	Since we are just using T/P board ambient temp sensor, nothing is actually triggering this yet.
END_CNG_PRESSURE_PROBE_CALIBRATION_ERROR	160	"P CalE"	Redundant probe mode, probes are not in consensus. One probe is dead, or probes are not calibrated.
END_CNG_TC_GOAL_CALC_ERROR	161	"TC ERR"	Temperature-compensated target pressure calculation is not returning from the kfactor board in time. Values may be a new edge-case which cannot computed with the iterative solver/
END_CNG_UNKN_ERROR	162	"CNG ERR"	Used for generic errors, but nothing triggers this at present.