



# **CNG Dispenser Owner's Manual**

**Version 1.0.2**

## 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 CNG Dispenser incorrectly or without authorisation.
- 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 CNG Dispenser 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 CNG Dispenser, or damages resulting from the inability to use the Compac CNG Dispenser, 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 CNG Dispenser'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 CNG Dispenser 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.
- Information in this manual shall not be deemed a warranty, representation, or guarantee. For warranty provisions applicable to the Compac CNG Dispenser, please refer to the warranty provided by the supplier.
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# Product Identification

Manual Title	CNG Dispenser Owner's Manual
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Publication Date	8/09/2010
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Models Covered	Standard	High Flow	Ultra-High Flow
Laser	L-CNG15 L-CNGD15	L-CNG50 L-CNGD50 L-CNG50-15	L-CNG80 L-CNGD80 L-CNG80-15
Legend	LGDCNG15 LGDCNGD15 LE3KG25D	LGDCNG50 LGDCNGD50 LGDCNG50-15	LGDCNG80 LGDCNGD80 LGDCNG80-15

Application	Compressed Natural Gas Power Supply Air Supply Pressure	275 Or 350 bar Max 220 - 240 VAC 50 Hz 2 Amp +/- 10% 5 to 10 bar ( Only required for units with air actuated valves)
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Related Manuals	Title	Publication Date
	CNG Dispenser Service Manual	September2010

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

## Document Information and Revision History

Document Details	CNG Owners' Manual	
File Name and Location		
Current Revision Author(s)	R Lacey	
Authorised By:	A.Kingstone	Release Date: 21/09/10

Version	Date	Author(s)	Revision Notes
1.0.2	07/09/2010	R Lacey	Initial release with Document control page

## Distribution

Name	Indicator	Location

# Symbols and Units of Measure

## Symbols

Symbols are used in this manual to highlight information that is critical to the safety of people and equipment, and for the safe and correct operation of the Compac equipment

**⚠ DANGER** *An extreme hazard that may result in death or injury if proper precautions are not taken.*

**⚠ DANGER** *A reminder of safety practices or unsafe practices that could result in personal injury or damage to associated equipment.*

**⚠ CAUTION** *A reminder of safety practices or unsafe practices that could result in damage to associated equipment and/or voids the warranty.*

**⚠ NOTE** *Important information essential to the installation and operation of the Compac equipment*

## Units of Measure

The following units of measure are used in this manual:

Unit	Measure
Pressure	Bar (bar)
Temperature	Degrees Celsius (°C)
Volume	Litres (L)
	Cubic Metres (m <sup>3</sup> )
Mass	Kilograms (kg)
Length	Metres (m)
	Millimetres (mm)
	Microns, Micrometres (µm)
	Inches (")
Torque	Newton Metres (Nm)
Voltage	Volts (V)
Current	Amps (A)
Frequency	Frequency (Hz)

# Safety

You must adhere to the following safety precautions at all times when working on the Compac equipment. Failure to observe these safety precautions could result in damage to the dispenser, injury, or death.

Make sure that you read and understand all safety precautions before operating the Compac equipment

## System Design

**⚠ DANGER** *Ensure the system design does not allow the dispenser inlet pressure to exceed its rating. The dispenser does not include any safeties to protect against excessive inlet pressure. If necessary, suitable protective devices should be fitted prior to the dispenser inlet.*

## Mechanical Safety

Observe the following electrical precautions:

**⚠ DANGER** *Never tighten a fitting under pressure, even if a fitting or joint is leaking. Always depressurise the line first*

**⚠ DANGER** *Never disassemble a fitting under pressure. Always depressurise the line first*

**⚠ DANGER** *Be very careful when disassembling frozen pipework, as gas pressure may be trapped and suddenly released. Always depressurise the lines first.*

**⚠ CAUTION** *Never reuse any O-ring seals that have been in a high pressure gas atmosphere and then exposed to air. These o-rings swell and cannot be reused. Always make sure you have a new seal kit available to replace the seals before disassembly*

**⚠ CAUTION** *Make sure that all internal surfaces are cleaned and that sliding surfaces are lightly greased with O-ring lubricant before reassembly. Dust and dirt entering components reduce the life span of the components and can affect operation*

**⚠ CAUTION** *Make sure the service area is thoroughly cleaned before starting to service CNG components. Dust and dirt entering components reduce the life span of the components and can affect operation*

## Electrical Safety

Observe the following electrical precautions:

**⚠ DANGER** *Always turn off the power to the CNG Dispenser before removing the box lid. Never touch wiring or components inside the CNG Dispenser with the power on.*

**⚠ DANGER** *Never power up the CNG dispenser with the flameproof box lid removed.*

**⚠ CAUTION** *Always turn off the power to the dispenser before removing or replacing software or memory IC's*

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

# Introduction

The Compac CNC dispenser is designed to provide safe and reliable dispensing of CNG fuels. They are available in either single or dual hose configurations and with different flow rates.

Compac CNG dispensers are controlled by a C4000 board which has many programmable features to suit your individual operation.

This manual contains the information required to operate and maintain your dispenser. Due to ongoing improvements and customised designs, there may be software features that are not available on your particular unit.

For clarity, this manual will refer to the "Dollars" display. If you do not use dollars please substitute this for your local currency

## Refuelling Modes

### Fixed Pressure Refuelling

The fuel is dispensed through a fixed pressure regulator. When fuel flow reaches a minimum rate. The fuel flow is shut off. Refer to Fixed Pressure Refuelling (see page 10)

### Fast Fill Refuelling

To enable fast refuelling, the pressure in the tank is measured then a small amount of precisely measured fuel is dispensed into the tank and the pressure rise is measured. From these figures, the volume of the tank is calculated and the tank filled rapidly to this level. When the tank is full the flow is shut off by a solenoid valve. Refer to Fast Fill Refuelling Process (see page 11)

### Temperature Compensated Refuelling

In cold environments, a tank filled to maximum pressure may exceed its maximum pressure if the temperature rises. To prevent overfilling, a thermometer measures ambient temperature and reduces the maximum fill pressure to eliminate this possibility. Refer to Temperature Compensated Refuelling Process (see page 12)

# Dispenser Operation

## Turning the Dispenser on

When power is applied to the dispenser, the display will show **PAUSE** and count down for 60 seconds. This start-up procedure ensures the dispenser is functioning properly before any gas is dispensed.

The dispenser is ready to use when the display shows **000**.

**NOTE** Before starting a fill, the software checks the status of the **Stop** switch. If the switch is latched on, the display will flash **STOP** and will not allow the fill to proceed until the switch is reset. (You can reset the switch by rotating the **Stop** switch clockwise.)

## Refuelling a Vehicle

There can be up to three storage banks for CNG refueling. During filling the dispenser sequences through these banks from low to high as the pressure in the vehicle cylinder increases and the flow rate drops.

**DANGER** Wearing appropriate personal safety equipment is recommended while refuelling a vehicle.

To refuel a vehicle:

1. Press the start button or remove the nozzle from the holster to initiate a fill.

The display will show **BBBBBB** and then clear, at this point both the gas and value totals will display **000**

2. Connect the refuelling nozzle to the vehicle
3. Open the nozzle refuelling valve to commence filling.
4. The dispenser will emit a long beep signalling the end of the fill, at this point the gas total display flashes **F, n**.
5. Close the refuelling valve.

**NOTE** Closing the valve shuts off the gas from the dispenser. It also vents the gas between the refuelling valve and coupling to the dispenser vent point.

6. Disconnect the nozzle from the vehicle.
7. Return the refuelling nozzle to the nozzle holder.

## Fixed Pressure Refuelling Process

The technical operation of a fixed pressure refueling dispenser is as follows:

1. Press the start button or remove the nozzle from the holster to initiate a fill.

The display will show **#####** and then clear, at this point both the gas and value totals will display **000**

2. Connect the refuelling nozzle to the vehicle
3. The refuelling valve is opened and the filling commences as follows:
  - If the vehicle tank pressure is less than low bank pressure, gas flows from the low bank.
  - When the vehicle tank pressure equals the low bank pressure but is less than the medium bank pressure, gas flows from the medium bank.
  - When the vehicle tank pressure equals the medium bank pressure but is less than the high bank pressure, gas flows from the high bank.
4. When the flow rate drops below the minimum flow rate ( **LFR** or **LFB** while filling from the high bank, the flow ceases, ending the fill.

**NOTE** *The sequencing rate between banks can be varied for either Fast, Normal or Slow rates using the Parameter menu. The factory setting is normally set to Fast. Refer to Sequencing Rate (see page 16)*

**NOTE** *The vehicle fill pressure is restricted to the regulator set pressure, this is normally set at 200 bar in the factory.*

## Fast Fill Refuelling Process

The fast fill refuelling process uses pressure sensors to calculate the quantity of gas required to fill a vehicle to a configurable target fill pressure (**FPA**).

The technical operation of a fast fill dispenser is as follows:

1. Press the start button or remove the nozzle from the holster to initiate a fill.

The display will show **#####** and then clear, at this point both the gas and value totals will display **000**

2. Connect the refueling nozzle to the vehicle
3. The refuelling valve is opened and when flow is detected the solenoids shut immediately. Pressure reading (P1) and amount dispensed (KG1) is recorded.
4. If the vehicle is within 20 bar of the target pressure (**FPA**), no filling takes place.
5. The solenoids are opened and filling continues as follows:
  - If P1 was less than 50 bar, the fill will continue for 20 seconds.
  - If P1 was greater than 50 bar but less than 100 bar, the fill will continue for 14 seconds.
  - If P1 was greater than 100 bar but less than 150 bar, the fill will continue for 10 seconds.
  - If P1 was greater than 150 bar but less than 180 bar, the fill will continue for six seconds.
6. The solenoids shut and pressure reading (P2) and amount dispensed (KG2) are recorded.
7. The amount of gas (KGf1) to completely fill the vehicle to **FPA** is calculated as follows:  
$$KGf1 = (KG2 - KG1) \times (FPA - P1) / (P2 - P1).$$
8. The dispenser fills to KGf1 and stops. This is the end of the fill.

## Temperature Compensated Refuelling Process

The technical operation of a temperature compensated dispenser is as follows:

1. Press the start button or remove the nozzle from the holster to initiate a fill.

The display will show **#####** and then clear, at this point both the gas and value totals will display **000**

2. Connect the refuelling nozzle to the vehicle
3. The refuelling valve is opened and when flow is detected the solenoids shut immediately. Pressure reading (P1) and amount dispensed (KG1) are recorded.
4. The compensated fill pressure Ptc is calculated. If the vehicle is within 20 bar of this pressure, no filling takes place.
5. The solenoids are opened and filling continues as follows:
  - If P1 was less than 50 bar, the fill will continue for 20 seconds.
  - If P1 was greater than 50 bar but less than 100 bar, the fill will continue for 14 seconds.
  - If P1 was greater than 100 bar but less than 150 bar, the fill will continue for 10 seconds.
  - If P1 was greater than 150 bar but less than 180 bar, the fill will continue for six seconds.
6. The solenoids shut and pressure reading (P2) and amount dispensed (KG2) are recorded.
7. The amount of gas (KGf1) to completely fill the vehicle to Pf is calculated as follows:

$$KGf1 = (KG2 - KG1) \times (Pf - P1) / (P2 - P1).$$

8. The dispenser fills to KGf1 and stops. This is the end of the fill.

## Reading the Dispenser Totals

To read the dispenser totals:

1. Quickly press the **Start** button or nozzle switch five times on the side of the dispenser you wish to view the totals for. The total is 10 digits long. The four most significant digits are displayed on the top line and the number wraps to the second line showing the six least significant digits.

The dispensed amount will be shown on the display for 10 seconds. This will be shown as:

**d** Followed by a 10 digit Total

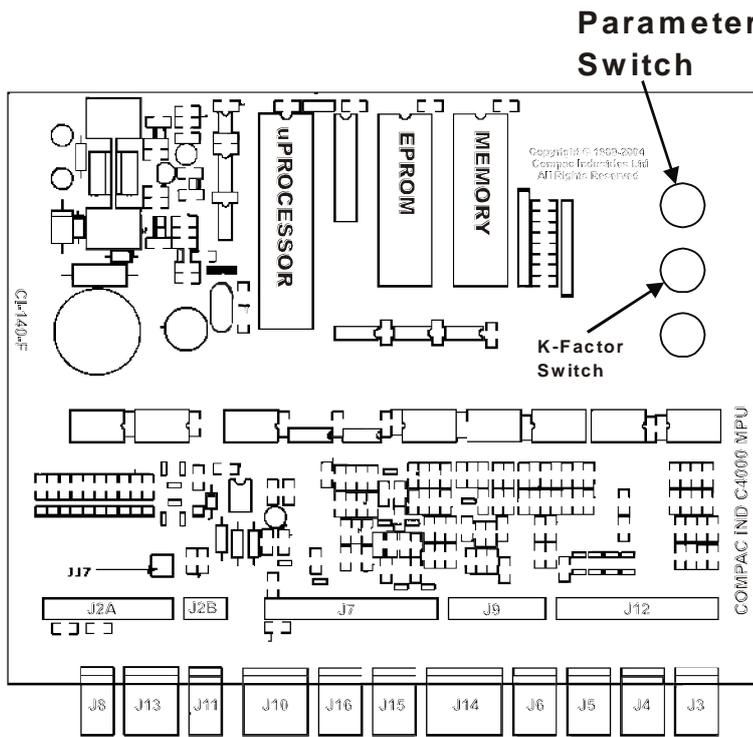
The dispensed quantity will then be shown next and will be displayed for 10 seconds. This will be shown as:

**L** Followed by a 10 digit Total

**⚠ NOTE** From software version HIA29.25.3CNG onwards the decimal place has been removed from the tote. There will two digits on the top (\$) display and six digits on the lower (kg) display

**⚠ NOTE** For dual dispensers, the A or B side will be indicated in the unit price display.

# Parameter Switch



## Parameter Switch

The **Parameter** switch is located on the C4000 processor board and allows you to adjust the unit price, hose number, sequencing rate, and password.

The Parameter switch also enables you to view the **Dispenser Software Version** and **End of Sale Indicators**.

## Menu Options

### Menu Options

Listed below is the order in which the **Parameter** switch menu options are presented. There are different menu options depending on the current setting of the C configuration code.

The **X** indicates that you can achieve the displayed menu option, regardless of what the indicated part is set to. You may need to change the C configuration in order to access the parameter code you require.

C Configuration	Set-Up Code	Code Description
CXXX61	<b>P</b>	Software Program version
	<b>P<sub>r</sub></b>	Unit Price
	<b>SE9</b>	CNG Sequencing rate ( <b>FAS, nDr, SLD</b> )
	<b>P<sub>n</sub></b>	Hose Number
	<b>Code</b>	Dispenser Passcode
CXXX62	<b>P</b>	Software Program version
	<b>P<sub>rA</sub></b>	Unit Price Side A
	<b>P<sub>rB</sub></b>	Unit Price Side B
	<b>P<sub>nA</sub></b>	Hose Number Side A
	<b>P<sub>nB</sub></b>	Hose Number Side B
	<b>Code</b>	Dispenser Passcode

## Unit Price

The **unit price** ( $P_r$ ,  $P_{rA}$  and  $P_{rB}$ ) is used to calculate the total value of the quantity dispensed. The unit price can be different on each side of a dual hose dispenser.

$P_r$  or  $P_{rA}$  is the unit price for side A of the dispenser.

$P_{rB}$  is the unit price for side B of the dispenser

The unit price can be set at the dispenser or set remotely with the **Compac Dispenser Monitor**.

**NOTE** *If the unit price is not set **Error E** will be displayed and the dispenser will not operate.*

### To set the unit price

1. Make sure that the dispenser is idle, with the nozzle in its holster.
2. Press and release the **Parameter** switch until the required unit price is displayed. ( $P_r$ ,  $P_{rA}$  or  $P_{rB}$ )
3. Enter in the unit price.

**NOTE** *Each press of the **Parameter** switch passes you over a digit in a setting, making the digit blink. Holding the switch down for more than a second changes whichever digit is currently displayed. If you want to pass over a setting without changing any digits, keep pressing and releasing the switch.*

1. Let the menu time out so that the value and quantity amounts are displayed.

## Sequencing Rate

**NOTE** Only available on CNG dispensers. Needs appropriate software.

The sequencing rate (SE9 ) enables you to set the percentage level of maximum flow that sequencing occurs to the next pressure bank.

There are three settings to choose from:

- **FAS:** Switching to the next higher-pressure bank occurs at 40% of the maximum flow rate for a particular bank.
- **nDr:** Switching to the next higher-pressure bank occurs at 30% of the maximum flow rate for a particular bank.
- **SLD:** Switching to the next higher-pressure bank occurs at 20% of the maximum flow rate for a particular bank.

**NOTE** From software version HIA29.25.3CNG onwards the sequencing rates are as follows:

- **FAS:** Switching to the next higher-pressure bank occurs at 60% of the maximum flow rate for a particular bank or when the flow rate drops to 5 kg/min, whichever occurs first.
- **nDr:** Switching to the next higher-pressure bank occurs at 40% of the maximum flow rate for a particular bank or when the flow rate drops to 3 kg/min, whichever occurs first.
- **SLD:** Switching to the next higher-pressure bank occurs at 20% of the maximum flow rate for a particular bank or when the flow rate drops to 1 kg/min, whichever occurs first.

**NOTE** The dispenser leaves the factory with the **FAS** setting.

### To set the sequencing rate

1. Make sure that the dispenser is idle, with the nozzle in its holster.
2. Press and release the Parameter switch (17 or more times) until SE9 xxx is displayed.
3. Enter the sequencing rate. Each press of the Parameter switch passes you over a digit in the setting, making the digit blink. Holding the switch down for more than a second changes whichever digit is currently displayed. If you want to pass over a setting without changing any digits, keep pressing and releasing the switch.
4. The displayed sequencing rate is now selected and operation of the dispenser will be affected immediately. The displays will reset after a ten (10) second timeout.

## Hose Number

The **Hose Number** ( $P_n$ ,  $P_nA$  and  $P_nb$ ) identifies the dispensers hose(s) when the dispenser is communicating to a forecourt controller such as the **Compac Dispenser Monitor**.

$P_n$  or  $P_nA$  is the hose number of side A of the dispenser.

$P_nb$  is the hose number side B of the dispenser

When using forecourt controller all dispenser hoses must have unique numbers.

### To Set the dispenser hose numbers

1. Make sure that the dispenser is idle, with the nozzle in its holster.
2. Press and release the **Parameter** switch until the required hose number is displayed. ( $P_n$ ,  $P_nA$  or  $P_nb$ )
3. Enter the hose number.

**NOTE** Each press of the **Parameter** switch passes you over a digit in a setting, making the digit blink. Holding the switch down for more than a second changes whichever digit is currently displayed. If you want to pass over a setting without changing any digits, keep pressing and releasing the switch.

4. Let the parameter menu time out so that the value and quantity amounts are displayed.

### Software Version HIA29.24.9CNG onwards

From this version of software onwards the hose number ( $P_n$ ) display has been modified to also display the following information:

- A count of the total error 9 faults in the unit shown in the price display.
- The display will also flash in the price/kg screen, the last recorded reason for the end of sale and the last recorded error 9.

This information can be used to as a diagnostic aid to check whether error 9 faults are occurring on a regular basis.

## Dispenser Software Version

The dispenser **software version** ( $P$ ) is the version number of the software currently loaded in the dispensers C4000.

See Dispenser Software Upgrade/Replacement for instructions on Upgrading dispenser software

### To Identify the Software Program Version Number

1. Make sure that the dispenser is idle, with the nozzle in its holster..
2. Press and release the **Parameter** switch once or until  $P$  is displayed. The system enters a diagnostic mode whereby it displays the software program version and performs a display segment test. It cycles through this program for approximately 10 seconds before reverting to the normal display.

When displaying program version data, the display panel shows  $P$  in the Dollars screen and **XXXXX**, in the Kilograms screen where **XXXXX** is the abbreviated program version number. For example: Software version HIA29.26.0CNG will read **29260**

## End of Sale Indicators

The **end of sale indicator** allows you to determine the reason why the last fill ended. This can be very useful for fault finding and diagnostics.

Recent versions of CNG software will flash the end of sale indicator in the price per litre window at the end of each fill during normal operation. Older versions of software will need to use the procedure below to view the end of sale indicator.

### To view the End of Sale indicators

1. Press and release the **Parameter** switch until the required hose number (**P<sub>n</sub>**, **P<sub>nA</sub>** or **P<sub>nb</sub>**) is displayed.
2. The number in the unit price display is the end of sale indicator for the hose number shown.

See the table below for the meaning of the number displayed.

Number	Meaning	Checks
1	Nozzle switch de-activated (does not apply to push to start dispensers).	
2	Preset or temperature compensated value reached. <b>Normal end of sale message for temperature compensated and Fast Fill dispensers.</b>	
3	Fill timed out. <b>Start</b> button pressed, or nozzle lifted, without flow.	Check inlet gas pressure. Check solenoid operation.Refer Solenoid Problems Check nozzle and breakaway for blockages.
4	The dispenser was stopped by a remote device such as a Point of Sale (POS) or Compac Communicator.	Check that the point of sale is not sending a stop command and is correctly configured.
5	Maximum display value reached.	Check display resolution (Sr) setting. Refer Display Resolution
7	An error has occurred. The error will be shown on the main display.	Check error code reason.Refer Error Codes
8	Outputs sequenced normally and dispenser finished on the low flow cutoff setting. <b>Normal end of sale message for regulator controlled dispensers</b>	
12	Parity error on main display. This is caused by a fault in the display or a bad connection in the display wiring loom.	Check displays are dry and all connections tight. Try swapping with another display if available.
14	Main display not detected. This is caused by a fault in the display or a bad connection in the display wiring loom.	See above.
25	<b>Stop</b> switch operated.	Check the stop switch wiring and switch operation. Refer CNG Dispenser Electrical Schematic (see page 34)
30	Maximum flow rate exceeded.	

31	Over-pressure switch has been activated.	
32	Dispenser on <b>Hold</b> . (No fuel will be dispensed).	
<b>The following End of Sale indicators are applicable to dispensers running in temperature compensation, fast fill, or PED modes:</b>		
20	The pressure at the first measurement was within 20 bar of the calculated maximum pressure.	Check for blockage in the fuel delivery hose, breakaway or vehicle pipework.
21	The pressure at the second measurement exceeded the calculated maximum pressure.	Check for blockage in the fuel delivery hose, breakaway or vehicle pipework.
22	The pressure at the third measurement exceeded the calculated maximum pressure.	Check for blockage in the fuel delivery hose, breakaway or vehicle pipework.
26	Twin pressure sensor values (when fitted) do not agree.	Check pressure sensor calibration.

## Dispenser Passcode

The **dispenser passcode** (**Code** and **PASS**) enables you to limit the access to sensitive settings found under the parameter and K-factor switches.

If set, only the dispenser software version can be viewed.

**NOTE** *If the dispenser is connected to the forecourt PC, you can access the dispenser information via the **Compac Dispenser Monitor** program, even if the dispenser is passcode is enabled.*

### To Set the Dispenser Passcode

1. Make sure that the dispenser is idle, with the nozzle in its holster.
2. Press and release the **Parameter** switch until **Code** is displayed.
3. Enter the new passcode.

**NOTE** *Each press of the **Parameter** switch passes you over a digit in a setting, making the digit blink. Holding the switch down for more than a second changes whichever digit is currently displayed. If you want to pass over a setting without changing any digits, keep pressing and releasing the switch.*

4. Let the menu time out so that the value and quantity amounts are displayed.

The dispenser is now passcode protected. Store the passcode in a secure place.

### To Disable the Dispenser Passcode

1. Make sure that the dispenser is idle, with the nozzle in its holster.
2. Press and release the **Parameter** switch until **PASS** is displayed.
3. Enter the current password.

**NOTE** *Each press of the **Parameter** switch passes you over a digit in a setting, making the digit blink. Holding the switch down for more than a second changes whichever digit is currently displayed. If you want to pass over a setting without changing any digits, keep pressing and releasing the switch.*

4. Press and release the **Parameter** switch until **Code** is displayed.
5. Clear the password by setting it to **000000**.

**NOTE** *Each press of the **Parameter** switch passes you over a digit in a setting, making the digit blink. Holding the switch down for more than a second changes whichever digit is currently displayed. If you want to pass over a setting without changing any digits, keep pressing and releasing the switch.*

6. Let the menu time out so that the value and quantity amounts are displayed.

The dispenser passcode is now disabled.

# Troubleshooting and Error Messages

## Troubleshooting

This **troubleshooting** section outlines issues that you may encounter when using the dispenser, and provides recommended actions.

For sites where the temperature falls below –10°C, power should only be removed from the dispenser for servicing.

Problem	Likely Cause(s)	Recommended Action
<b>For all problems not listed here please contact your service agent</b>		
After powering the dispenser, <b>PRUSE</b> is displayed and the countdown from 60 doesn't start.	For push to start dispensers the <b>start</b> button is held down.	<ul style="list-style-type: none"> <li>▪ Release the <b>start</b> button.</li> </ul>
	The nozzle is not stowed or the nozzle switch is active.	<ul style="list-style-type: none"> <li>▪ Correctly stow the nozzle.</li> </ul>
The C4000 electronics are not working. The indicator LEDs are off and nothing happens when you lift the nozzle (i.e., no beeps or <b>BBBBBs</b> are displayed).	Unacceptable voltage spikes are causing the fuses on the C4000 to blow.	<ul style="list-style-type: none"> <li>▪ Fit a voltage-stabilising UPS to the dispenser.</li> <li>▪ Contact your service agent.</li> </ul>
	There is low input voltage.	<ul style="list-style-type: none"> <li>▪ Turn the dispenser off and then on again.</li> <li>▪ Check power supply to dispenser.</li> </ul>
A display LCD segment is always on or always off.	Display is faulty.	<ul style="list-style-type: none"> <li>▪ Contact your service agent.</li> </ul>
When the <b>start</b> button is pressed the dispenser does not display the <b>BBBBBs</b> and reset for the next fill.	The dispenser number has not been set.	<ul style="list-style-type: none"> <li>▪ Set the dispenser number (see page 17).</li> </ul>
	The <b>start</b> button or <b>nozzle</b> switch is faulty, stuck, or broken.	<ul style="list-style-type: none"> <li>▪ Check that the <b>nozzle</b> switch is operating correctly and is not broken. Check the nozzle switch mechanism is free to move in and out.</li> <li>▪ Contact your service agent.</li> </ul>
	The connection between the forecourt controller and dispenser communications connection is faulty.	<ul style="list-style-type: none"> <li>▪ Check the forecourt controller.</li> <li>▪ Contact your service agent.</li> </ul>
The dispenser is under filling the vehicle	The pressure in the storage cascades is lower than target filling pressure.	<ul style="list-style-type: none"> <li>▪ This is not a dispenser fault.</li> <li>▪ If cascade pressure is above target filling pressure please contact your service agent.</li> </ul>
The preset display is flashing after a fill.	The preset amount has been exceeded.  <b>⚠ NOTE</b> <i>The preset display will stop flashing when the next fill is started.</i>	<ul style="list-style-type: none"> <li>▪ If problem continues contact your service agent.</li> </ul>
Gas flows but does not read up on the display.	The C4000 needs to be reset.	<ul style="list-style-type: none"> <li>▪ Re-power dispenser.</li> <li>▪ If problem continues contact your service agent.</li> </ul>
The dispenser stops at <b>999999, 999999</b> or <b>999999</b> units according to where the decimal point is set.	The dispenser will stop dispensing if either the money or the quantity displays ever reach these values.	<ul style="list-style-type: none"> <li>▪ Hang up the nozzle to reset the display and restart. This is not a dispenser fault.</li> </ul>

	<p> <b>NOTE</b> When fixing a Compac CNG Dispenser fault, please follow the recommendations and safety information in this manual. Failure to do this may cause injury or void the warranty.</p>
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## Fault Codes

**Fault codes** indicate any problems with the dispenser. These problems are indicated to you by codes displayed on the screen.

After you have physically corrected a fault, you need to clear the fault message displayed on the control panel before normal operation can resume.

You can clear all fault codes by quickly pressing the **start** button or **nozzle** switch five times. This also displays the tote information, which remains on the screen for 10 seconds for each section of tote data.

**NOTE** You should read and understand all safety precautions before operating or maintaining the Compac CNG Dispenser.

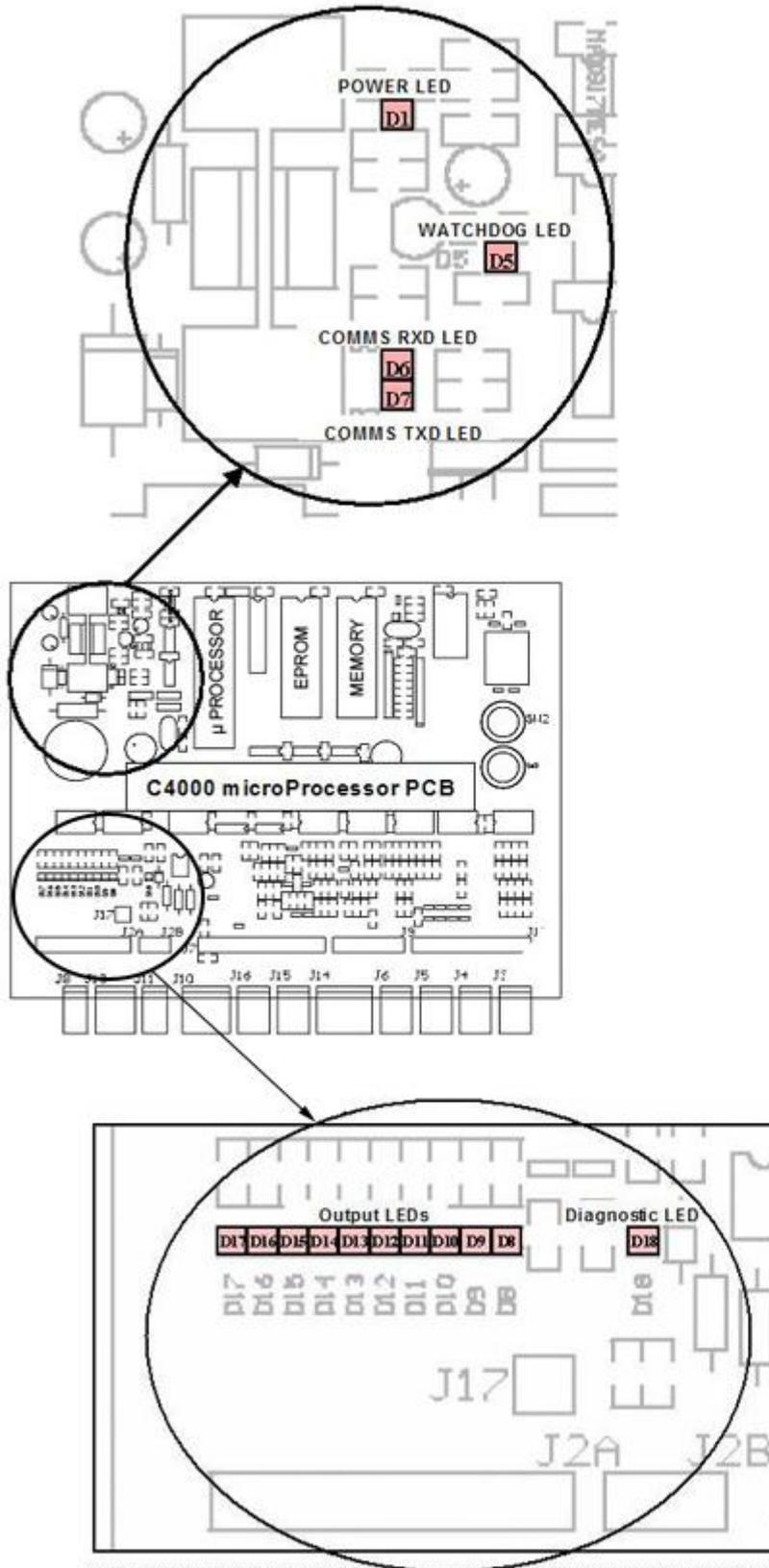
**NOTE** When fixing Compac CNG Dispenser faults, please follow the recommendations in this manual. Otherwise you may injure yourself and void the warranty.

Fault Code	Likely Cause	Recommended Action
<b>Err 3</b>	Loss of price in the C4000 head.	<ul style="list-style-type: none"> <li>If the dispenser is connected to a site Controller, the price on the dispenser should be set to <b>000</b> and the pricing should be sent from the Controller.</li> </ul> <p>This procedure is outlined in the Hose Price section (see page 15).</p> <ul style="list-style-type: none"> <li>If the dispenser is not connected to a site Controller, the price must be set on the dispenser.</li> </ul> <p>This procedure outlined in Hose Price section (see page 15).</p>
	Loss of hose number in the C4000 head.	<ul style="list-style-type: none"> <li>Check that the hose number has been set.</li> </ul> <p>This procedure is outlined in the Hose Number section (see page 15).</p>
<b>Err 8</b>	Excessive reverse flow.	<ul style="list-style-type: none"> <li>Repower dispenser</li> <li>If problem persists contact your service agent.</li> </ul>
<b>Err 9x</b>	Gas metering error	<ul style="list-style-type: none"> <li>Re-power the dispenser.</li> <li>If problem persists contact your service agent</li> </ul>
<b>Err 10</b>	No Configuration data	<ul style="list-style-type: none"> <li>Contact your service agent</li> </ul>
<b>Err 12</b>	EPROM failure.	<ul style="list-style-type: none"> <li>Contact your service agent</li> </ul>
<b>Err 13</b>	The temperature pressure interface board is disconnected or has failed.	<ul style="list-style-type: none"> <li>Contact your service agent</li> </ul>
<b>Err 14</b>	The temperature probe has been disconnected, or is connected with wire links still in place.	<ul style="list-style-type: none"> <li>Contact your service agent</li> </ul>
<b>Err 15</b>	The pressure probe has been disconnected.	<ul style="list-style-type: none"> <li>Contact your service agent</li> </ul>
<b>PRUSE</b>	The dispenser is in start-up mode.	<ul style="list-style-type: none"> <li>Hang up the nozzle.</li> </ul> <p>The <b>PRUSE</b> message stays on the</p>

Fault Code	Likely Cause	Recommended Action
		display for 60 seconds, then changes to <b>000</b> . When the display changes to <b>000</b> , the dispenser is ready to dispense gas.
<b>STOP</b>	The <b>Stop</b> switch is latched on.	<ul style="list-style-type: none"> <li>▪ Establish why the <b>Stop</b> switch was operated.</li> <li>▪ If safe, reset the switch by rotating the button clockwise.</li> </ul>
<b>PrSErr</b>	There is a pressure difference of 10 bar or more between the pressure probes.	<ul style="list-style-type: none"> <li>▪ Contact your service agent</li> </ul>
<b>:00</b>	The dispenser's power supply has been turned off and back on since the last transaction.	<ul style="list-style-type: none"> <li>▪ The colon disappears when the nozzle is lifted for the next transaction.</li> </ul>
<b>Ab d</b> <b>PE d</b> <b>PE P</b> <b>PS d</b> <b>PS P</b>	The display has an error	<ul style="list-style-type: none"> <li>▪ Check for moisture or humid environment</li> <li>▪ Contact your service agent</li> </ul>

# Indicator LEDs

LED indicators are used to provide power, output status, and diagnostic information.



**Indicator LEDs**

LED	Reference	Description
Power	D1	Indicates power is being supplied to the processor board. If it is not lit there is a fault on the processor power supply.
RXD	D6	Flashes when polling information is being received.
TXD	D7	Flashes when polling information is being sent.
Diagnostic	D18	Provides diagnostic information (see below).

**Diagnostic LED**

The diagnostic LED D18 flashes in three different states when the processor is working properly, as outlined in the table below.

State	LED Flashes	When
1	Slowly and consistently.	The hose is idle and in stand-alone mode.
2	Slowly but erratically.	The hose is idle and communicating with a Controller.
3	Quickly.	The start button is being pressed or the nozzle has been lifted from its holster.

# Appendix

## Approvals

The C4000 electronic head is ATEX approved for use in a Class 1, Zone 1 hazardous area. Dispensers are wired to Class 1, Zone 1 Australian and European standards.

Approval numbers appear on labels attached to the C4000 lid and the flameproof junction box lid.

ATEX Approval Marking on the Equipment	Equipment or Protective System	EC - Type Examination Certificate Number
II 2 G EEx d II A T3 ( $T_{amb} = -25^{\circ}\text{C}$ to $+55^{\circ}\text{C}$ )	A Type C4000 Control Unit	Baseefa03ATEX0612
$\text{M}$ II (2)G [EEx ib] IIA ( $-25^{\circ}\text{C} \leq T_a \leq 80^{\circ}\text{C}$ )	C4000 Power Supply Unit PCB CI138 & CI139	Baseefa03ATEX0684X
$\text{M}$ II G EEx ib IIA T3 ( $-25^{\circ}\text{C} \leq T_a \leq 80^{\circ}\text{C}$ )	C4000 Fuel Dispenser Control Unit	Baseefa03ATEX0683X
(CWIT Aerial only:- $\text{M}$ II 1G EEx ia II A T3		

The Compac CNG equipment is also PED approved for use up to 275 bar.

PED Approval Marking on the Equipment	Equipment	EC - Type Examination Certificate Number
$\text{M}$ Cat. II Group I	Filter housing, Solenoid, & various Dispenser models.	SGS UK Ltd. 0790/025074

## Specifications

### Model Specifications

There are various CNG Dispenser models and options available.

The models include:

- Legend frame or Laser frame.

The options include:

- One, two, or three line.
- Single or dual hose.
- Fixed pressure final fill cut-off or temperature compensated final fill cut-off.
- Standard, high, or ultra-high flow.

Model numbers		Standard	High Flow	Ultra-High Flow
Laser	Single	L-CNG15	L-CNG50 L-CNG50-15	L-CNG80 L-CNG80-15
	Dual	L-CNGD15	L-CNGD50	L-CNGD80
Legend	Single	LGDCNG15	LGDCNG50 LGDCNG50-15	LGDCNG80 LGDCNG80-15
	Dual	LGDCNGD15 LE3KG25D (Pakistan only)	LGDCNGD50	LGDCNGD80

## Technical Specifications

### Operating Conditions

Compac CNG Dispensers (excluding hose assembly) are designed to operate within the atmospheric environment. Gas parameters are outlined below.

CNG Dispensers require the following operating conditions:

<b>Air temperature range</b>	- 25 °C to + 55 °C
<b>Air humidity range</b>	10% to 95%
<b>Gas type</b>	High pressure natural gas (CNG)
<b>Gas temperatures</b>	- 40 °C to + 80 °C (continuous) - 55 °C to + 80 °C (intermittent)
<b>Maximum Water Dew Point</b>	- 32 °C at 250 bar
<b>Maximum Working Pressure (Inlet)</b>	275 bar (350 bar option)
<b>General Specifications</b>	<b>Power Requirements</b>
	230V +/-10%, 50Hz, 2A

Specific Specifications	Standard Model	High-flow Model	Ultra high-flow Model
<b>Flow</b> (The maximum flow rate is not only determined by the type of dispenser but also depends on the size of the refuelling hose, the model of the breakaway, the type of refuelling nozzle, and the vehicle coupling.)	1 – 15 kg /min	1-50 kg /min	1 – 80 kg /min
<b>Pressure rating</b> (350 bar options utilise air actuated valves and require a compressed air supply.)	275 bar (350 bar option)	275 bar (350 bar option)	350 bar
<b>Accuracy</b>	+/- 1.0%	+/- 1.0%	+/- 1.0%
<b>Meter</b>	Compac KG80 coriolis mass flow	Compac KG80 coriolis mass flow	Compac KG80 coriolis mass flow
<b>Internal Pipework</b>	1/2"	1/2"	1/2" or 3/4"
<b>Refuelling hose</b>	3/8"	1/2"	1/2" or 3/4"
<b>In-line breakaways</b>	Various available	Various available	Heavy duty
<b>Refuelling valve</b>	NGV1 or NZ 7/16" probe	NGV1 or NGV2	NGV2
<b>Laser (without hoses or high masts)</b>	830W x 450D x 1608H	830W x 450D x 1608H	830W x 450D x 1608H
<b>Legend (without hoses)</b>	850W x 425D x 2355H	850W x 425D x 2355H	850W x 425D x 2355H
<b>Minimum flow cut-off</b>	0.5 -10 kg/min (settable)	0.5 -10 kg/min (settable)	0.5 -10 kg/min (settable)
<b>Maximum flow cut-off</b>	10 - 99 kg/min (settable)	10 - 99 kg/min (settable)	10 - 99 kg/min (settable)

## Component Specifications

See below for information on serviced equipment.

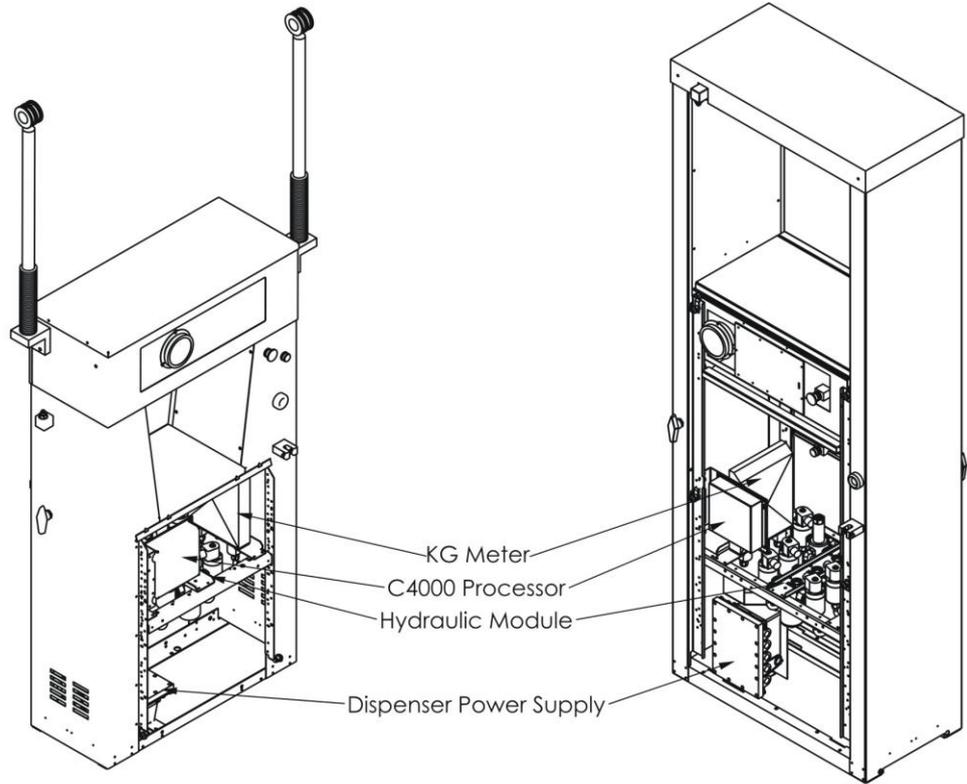
Equipment Item	Compac Code	Specifications	Description
Coalescing filters		Grade 10 Coalescing Filter	The coalescing filters are designed to trap dirt, moisture, oil, and other debris that may damage the valve seals. A Grade 10 coalescing filter will remove 95% of liquid aerosols in the 0.3 to 0.6 micron range.
Compac filter/check valve	FCVCI-12-SS	3/4" SAE female inlet. 2 x 3/4" SAE female outlets. 350 bar max.	The filter/check valve prevents back-flow from the high storage to the medium and low storage, and from the medium storage to the low storage.  The valve has a metal to metal seat and should not leak or require servicing.
Solenoid valve	SCI-12-SS	3/4" SAE female inlet. 3/4" SAE female outlet. 275 bar max.	The high flow solenoid valve is designed to control the flow of gas in a CNG Dispenser.  Between the inlet and outlet, the valve opens with a differential pressure of more than 275 bar.
Regulator valve	RCI-12-SS	3 x 3/4" SAE female inlets. 3/4" SAE female outlet. 275 bar max.	The regulator is a high flow valve, designed to limit the outlet pressure of the dispenser.  In the <b>fixed pressure dispenser</b> , the regulator limits the final fill pressure to 200 bar.  In the <b>temperature compensating dispenser</b> , the regulator acts as a safety device to limit the amount of over-pressure if the main solenoid fails to shut off at the correct pressure.
Three-way refuelling valve	RVCI-04	1/4" NPT ports 250 bar max.	The three-way valve is designed specifically for refuelling CNG vehicles. The inlet, outlet, and exhaust ports are designed to be used as shown in the figure in the Dispenser Component Location section (see page 32). Do not re-pipe the valve in a different configuration.
Nozzles	7/16" NZ Probe 1-15 kg/min	1/4" NPT port.	In New Zealand, the probe complies with NZS 5425.1.  In Australia, the probe complies with AS/NZS 2739.
	OPW CT1000 1-50 kg/min	9/16" SAE inlet port 200 bar max.	Nozzles allow refuelling for high pressure NGV applications.
	OPW CT5000 1-80 kg/min	7/8" SAE inlet port 250 bar max.	Nozzles allow refuelling for high pressure NGV applications.
Inline breakaways	QBCI-09 1-15 kg/min	9/16" SAE inlet & outlet ports	Brass inline breakaway with reconnectable design.
	OPW ILB- 1 1-50 kg/min	9/16" SAE inlet & outlet ports. 250 bar max.  150 to 200 lbs. (668 to 890 N) breakaway force.	Inline breakaway with reconnectable design. Corrosion-Resistant with high flow for all NGV-1 nozzles.
	OPW ILB-5 1-80 kg/min	7/8" SAE inlet & outlet ports. 310 bar max.  150 to 200 lbs. (668 to 890 N) breakaway force.	Inline breakaway with reconnectable design. Corrosion-Resistant with high flow quick fuelling of large storage vehicles.

Isolation ball valve			Parker 2-way 8 series ball valve
Microprocessor	C4000		The Compac C4000 processor controls all the electronics in the dispenser.
Display	GD1, GD2 or GD3		The display has six 1" digits for price, six 1" digits for quantity and four 3/4" digits for unit price. (Available with one, two or three unit price displays.)
Pressure Gauge			Dual scale pressure gauges are available with psi and either bar, MPa, or kPa. CE Approved
Hose		Parker single and twin line hose. 3/8", 1/2" or 3/4".	The hose is specifically designed to dissipate static electrical build-up and wear resistance. Each hose assembly must be properly grounded.  The temperature range for the hose is -40 to +66°C.

# Mechanical Drawings and Component Details

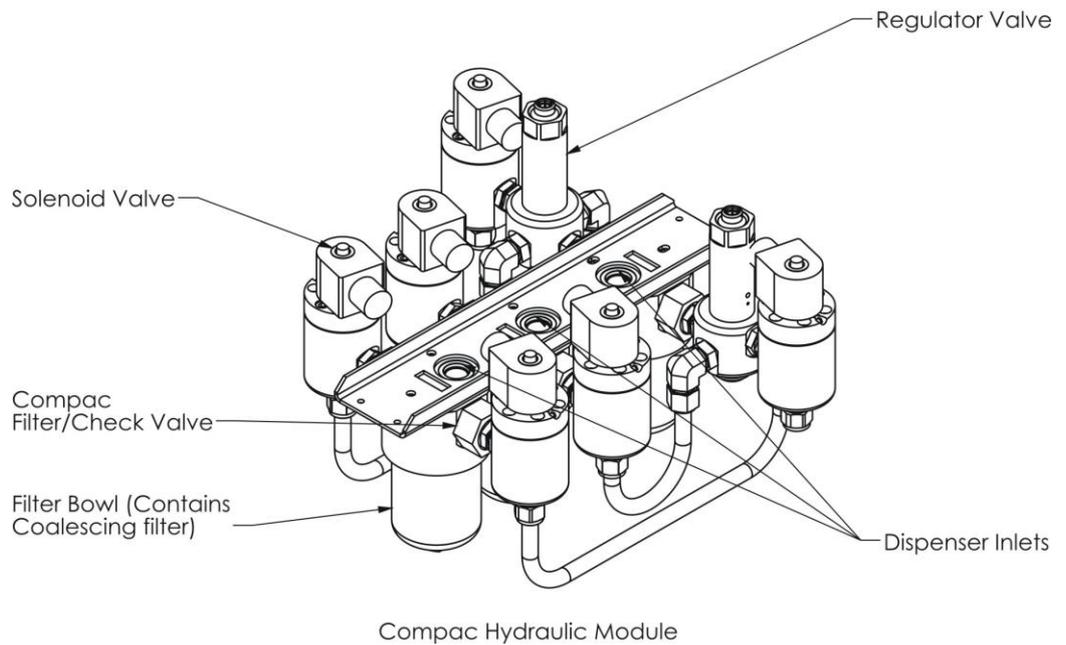
## Dispenser Component Locator

**NOTE** The C4000 Dispenser Power supply is housed in a flameproof box. All other components are simply located in enclosures. See below.



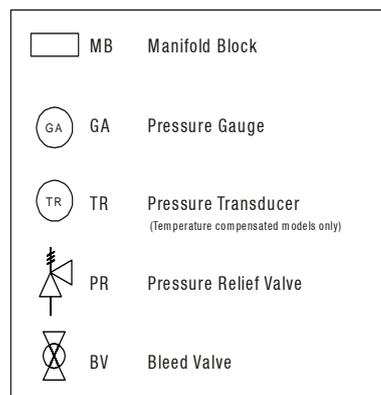
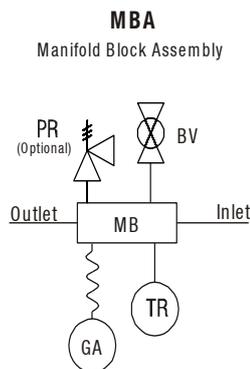
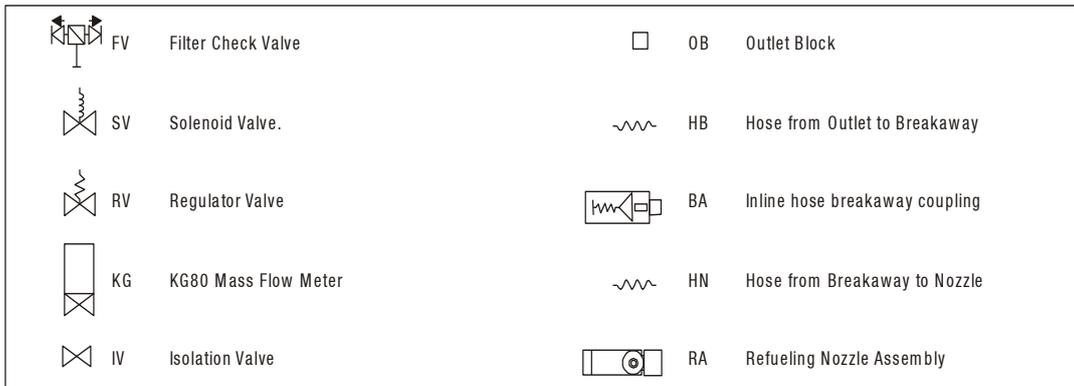
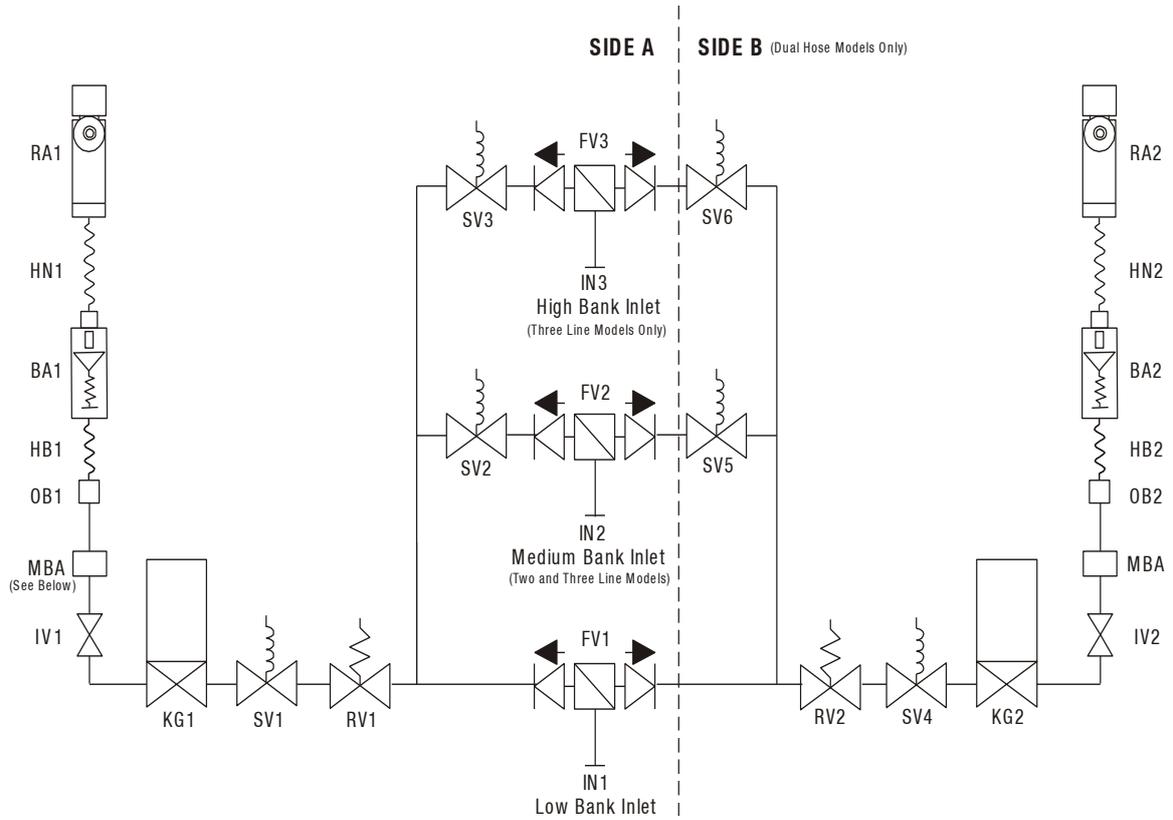
Compac CNG Laser

Compac CNG Legend



Compac Hydraulic Module

Hydraulic Layout



# CNG Dispenser Electrical Schematic

