BioBlend Installation Manual
Version 1.0.2

Model: C4000 BioBlend Controller
Date: 7th December 2018

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 C4000 processor is electrical shock. This hazard can be avoided if you adhere to the procedures in this manual and exercise all due care.
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- Variations in installation and operating conditions may affect the Compac C4000 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 C4000 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.
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Product Identification

Specifications

Models Covered	This manual applies to the C4000 BioBlend controller. ***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.

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Document Control

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Document Information	
Manual Title	BioBlend Installation Manual v.1.0.1
Current Revision Author(s)	R Liu
Original Publication Date	12/10/2011
Authorised By	W Zheng

Revision History			
Version	**Date**	**Author(s)**	**Revision Notes**
1.0.0	12 Oct 2011	R Lacey	Initial release
1.0.1	12 Nov 2018	S Laycock	Updated format, added footprints and hydraulics for MR400S
1.0.2	07 Dec 2018	R Liu	Updated Contact Information

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Safety

You must adhere to the following safety precautions at all times when working on the Compac C4000 processor. Failure to observe these safety precautions could result in damage to the Compac C4000 processor, injury, or death.

Make sure that you read and understand all safety precautions before operating the Compac C4000 processor.

Mechanical Safety

Make sure that the service area is thoroughly clean when servicing. Dust and dirt entering the components reduce the life span of the components and can affect operation.

Electrical Safety

Always turn off the power to the Compac C4000 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 C4000 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.

The C4000 head, and its associated circuits and wiring, is a certified piece of electrical equipment approved for use in a hazardous area (Class 1 Zone 1, Group IIA T3). Only parts identical to those covered by the certification may be used where the integrity of the intrinsic safety may be affected. All circuit boards are to be repaired only by Compac Industries Ltd.

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.

Introduction

The Compac C4000 BioBlend controller has been specifically adapted to enable the dispensing of customised mixtures of diesel and bio-diesel fuels.

Using two pumps and solenoids, bio-diesel and diesel are drawn from their respective tanks and blended at a ratio of between 20% to 40% bio-diesel to diesel in 5% increments.

The blend can be selected in two ways:

1) Static Blend. This is set in the C4000 using the parameter switch menu and is used for stand alone pumps with no fuel management system connected. Blend ratios in 5% increments from B20 (20% bio-fuel) to B40 (40% bio-fuel).

2) Dynamic Blend. The blend ratio is set on each fuel card and sent from the ComFMS board to the C4000. Gradients in 5% can be set from B20 (20%) to B40 (40%).

The system works by turning on both pump motors and then pulsing the primary and secondary solenoids of the bio-fuel circuit to achieve the correct blend ratio. Two meters are used, one for each fuel. The combined total of fuel delivered through both meters is displayed on the main pump display.

The total flow rate of the pump will vary depending on the blend selected. At a low ratio of bio-fuel the flow rate will be lower as the majority of the blend will be supplied by the diesel pump and motor. As the ratio of bio-diesel increases, the total flow rate will increase as the flow will be a combination of both pumps and motors.

NOTE: *The pump is designed to dispense mineral diesel with the addition of bio-diesel. It is not designed to dispense 100% bio-diesel if the mineral diesel tank is empty. Meter errors and fuel overflow through the air eliminator may occur if this is attempted.*

Software Requirements

For the system to operate correctly special software must be used in the C4000 processor board and the ComFMS board if applicable. The blend percentage can only be controlled through a Compac fuel management system, it is not able to be controlled by a 3rd party system.

Software versions are:

C4000: HIA29253_BLEND

ComFMS: EAB01828_BLEND

Pre-installation

Transit Damage

Once the unit is received on site, inspect the cabinet for the following:

- Shipping damage to cabinet, display or any other equipment.
- Water damage to components

Report any damage to the transport company and to the help desk. Take photographs if required.

Tampering

Inspect for evidence of tampering with the unit especially card reader or unauthorised wiring. Report any concerns to the help desk. Take photographs if required.

Vibration

Inspect terminals, plugs and IC chips to check they are securely in place and have not loosened due to vibration.

Site Issues

Check that all wiring and pipework has been installed correctly and is undamaged. Report issues to site manager.

Tools Required

It is expected that installers will carry a comprehensive tool kit including:

- Metric and imperial spanners
- Metric and imperial socket set
- Metric and imperial allen keys
- Torx and security torx keys
- Phillips, pozidriv and flat blade screwdrivers
- Electric impact drill with conventional and masonry drill bits
- Wire cutters
- Wire stripper
- Crimping tool
- EPROM extractor
- Multimeter
- Earthing wrist strap
- Laptop with fully charged battery and wireless modem
- LAN cable
- Fully charged cell phone
- Test cards and/or authorisation keys

The above list is a suggested minimum. It is recommended that you read the manual thoroughly and include any other equipment that may assist you in completing the job safely and quickly.

Site Preparation

Refer to the Site Audit document if supplied.

To ensure maximum operating life, care should be taken when siting the dispenser. Considerations should include:

- The unit is not designed to be constantly exposed to the elements. A canopy or shelter should be installed to protect it.
- The card reader and PIN pad should face away from the prevailing wind especially in dusty or wet areas.
- In areas experiencing extremes of weather (heat, cold, wind, rain, salt spray etc.) consideration should be given to installing additional shelter.
- On heavy vehicle sites, mounting the unit on a raised pad and/or installing bollards to help protect from damage.
- The base needs to be attached to a smooth, level surface of sufficient strength to securely hold the retaining bolts or fasteners.

Electrical Preparation

Power and communication cables must meet or exceed local regulation requirements.

If no local regulations exist, we recommend as a minimum:

- Power: 3 core 2.5 mm^2 Steel Wire Armour (SWA) cable
- Comms: 2 core 1.5 mm^2 Steel Wire Armour (SWA) cable

There should be a minimum of a 2 metre tail for all wiring.

NOTE: *The length of the communications cable must not exceed 100 metres.*

Pipework Preparation

Pipework should be laid in accordance with local regulations.

To obtain maximum flow on a self contained pump, observe the following guidelines:

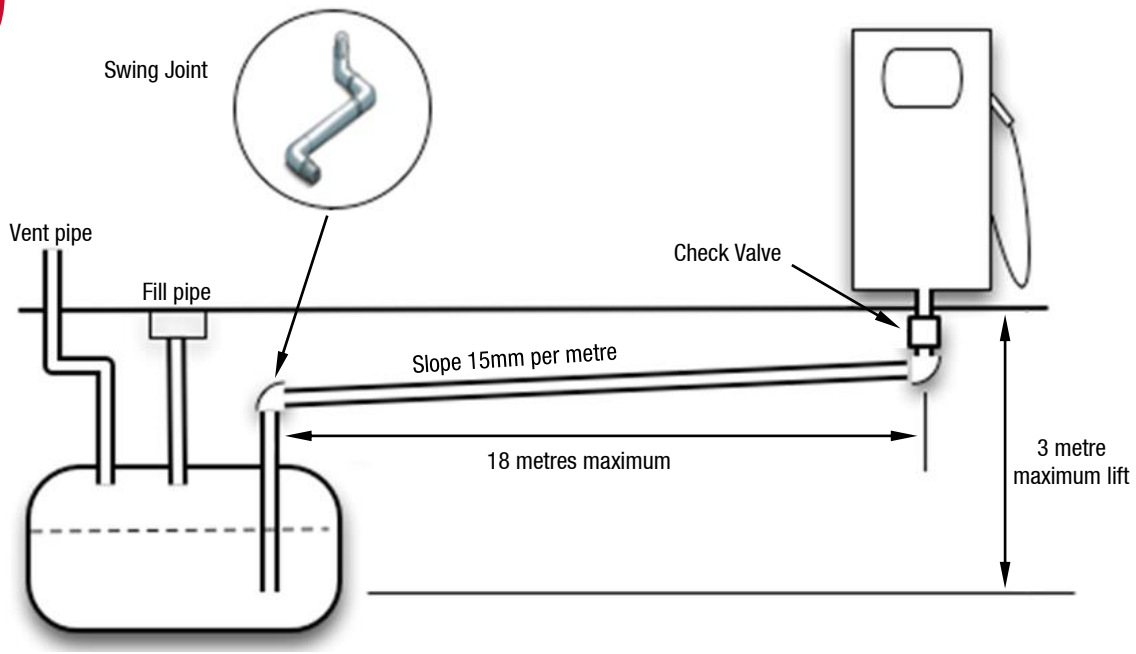
- Total length of horizontal piping between tank and pump should be no longer than 18 metres.
- Piping specifications: For 40 L/min pumps, use 1½" galvanized or approved non-metallic pipe. For 80 L/min pumps use 2" galvanized or approved non-metallic pipe.
- Only one pumping unit is permitted for each underground pipe. Do not use tee joints to connect two pumps into one pipe.
- Pipe must slope up from the tank to the pump (approximately 15 mm per metre). Pipe should be straight and supported along its length.
- All horizontal piping must be buried at least 450mm below ground level.
- The area under the pumping unit(s) must be filled with sand or dirt as far up the suction line as possible. Use water to pack the sand or dirt when put in place.
- Avoid asphalt drive surfaces covering the piping. Asphalt increases heat absorption causing vapour lock.

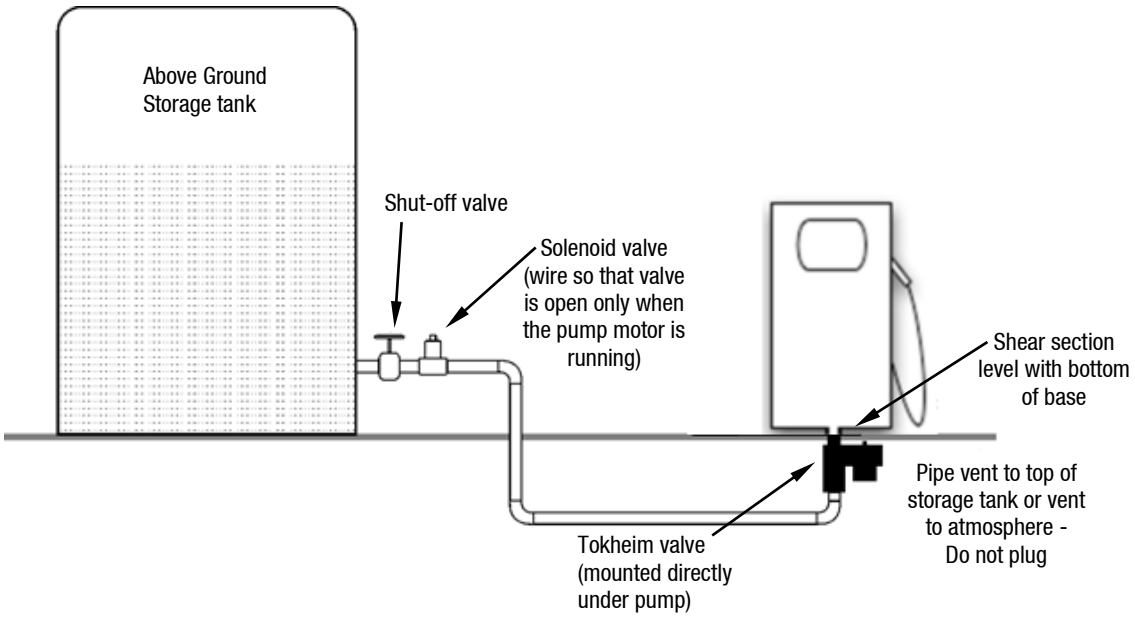
- Static lift must not exceed 3 metres (vertical distance from the product level in the tank to the centre of the pump unit).
- To absorb ground movement from settling of the tank, frost heaving of the ground or pump island settling, a swing joint must be used in the supply line at the tank and directly underneath the dispenser. Three additional directional changes using elbows are permitted.
- Piping must hold a 3.4 Bar (50PSI) pressure test for a minimum of 10 minutes.

Refer to the footprint drawings for pump installation details.

Check Valve

A Check Valve must be installed at the tank end of the suction pipe on the top of the tank in a serviceable location. Many clients install an extra check valve at the inlet to the pump. It is important neither of the check valves interfere with the flow of fuel. They must be adequately sized.





CAUTION: *The pump inlet must not be pressurised at any time. This will cause fuel to flow from the air eliminator. Unregulated connection to an above ground tank will cause pressurisation.*

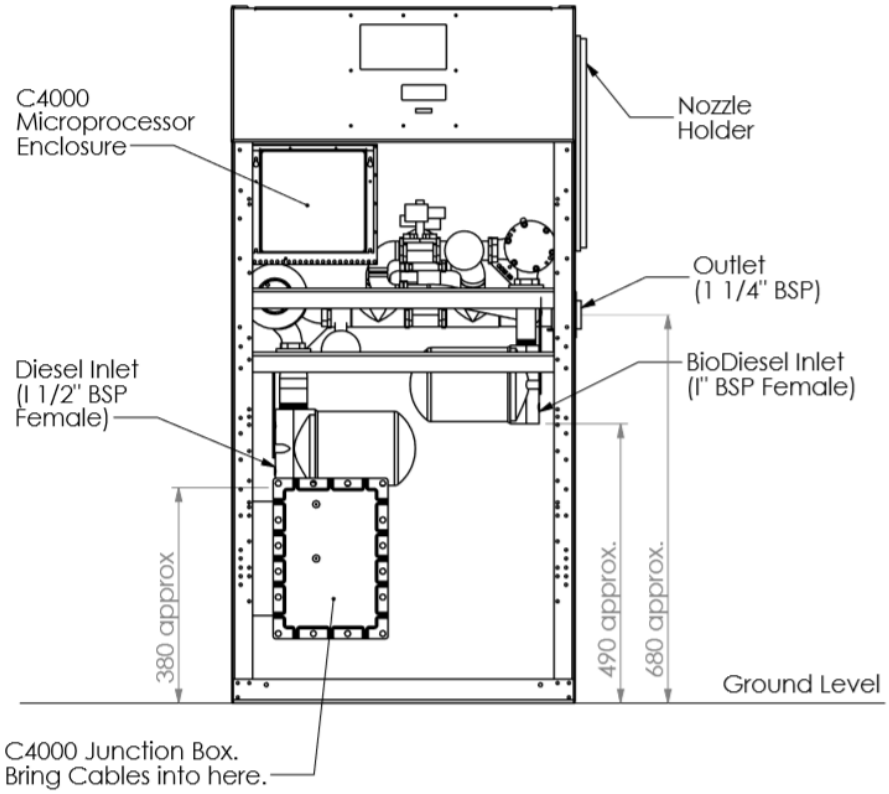
CAUTION: *For above ground tanks a regulator valve such as a Tokheim valve or similar device MUST be used so that the inlet of the pump cannot become pressurised at any time.*

NOTE: *The air switch is not to be disconnected. Disconnection will void NSC and TMU approvals.*

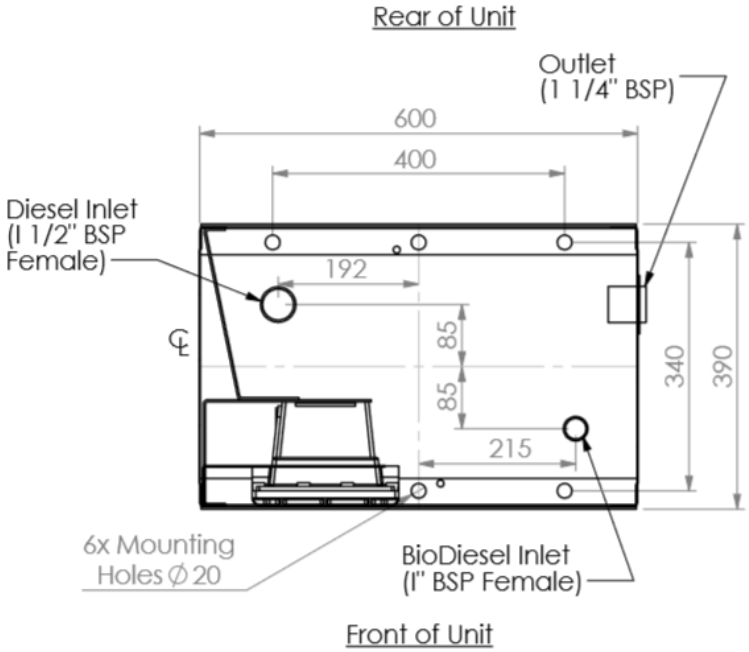
NOTE: *The air eliminator chamber is not to be piped back to the tank. This will prevent it from working and may damage the pump.*

Footprints

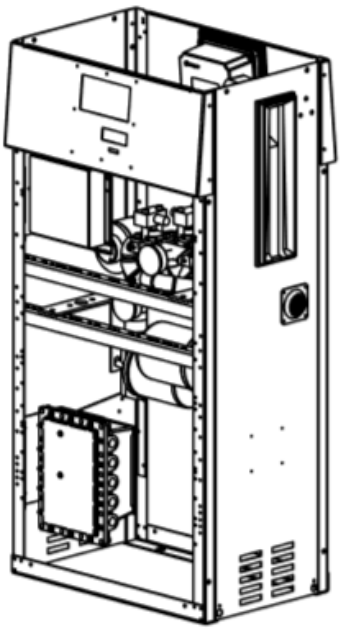
Master PN3 MR160S



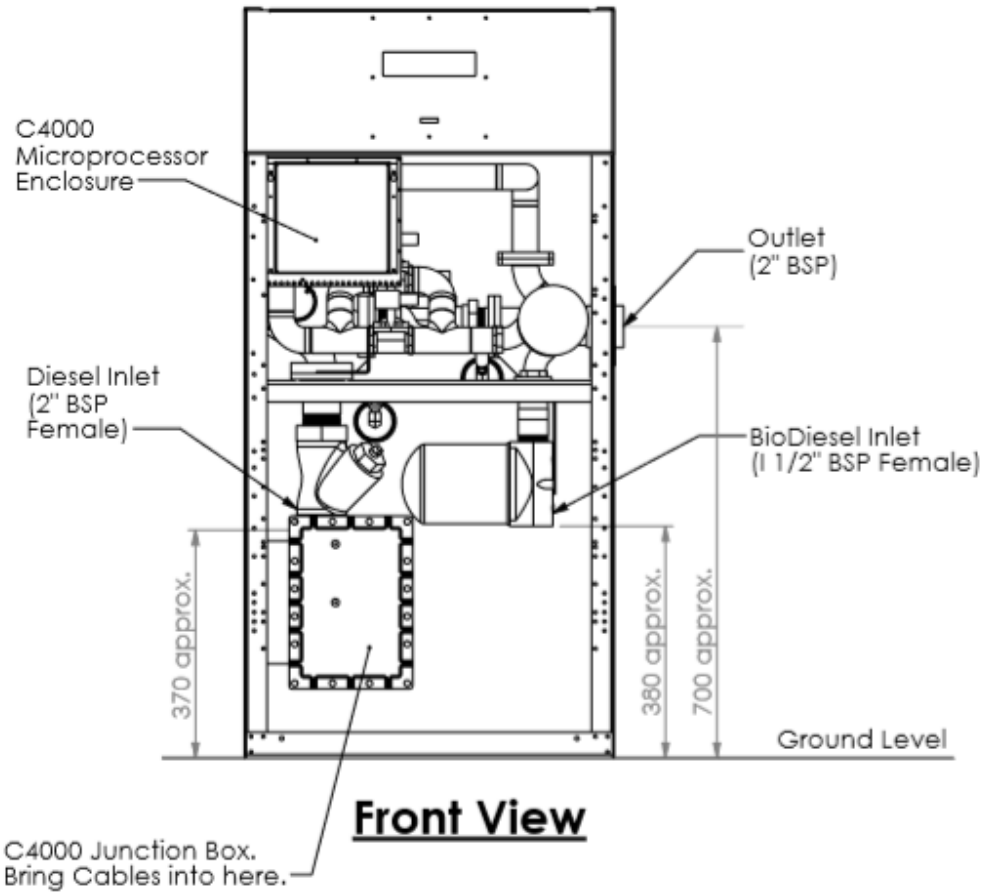
Front View



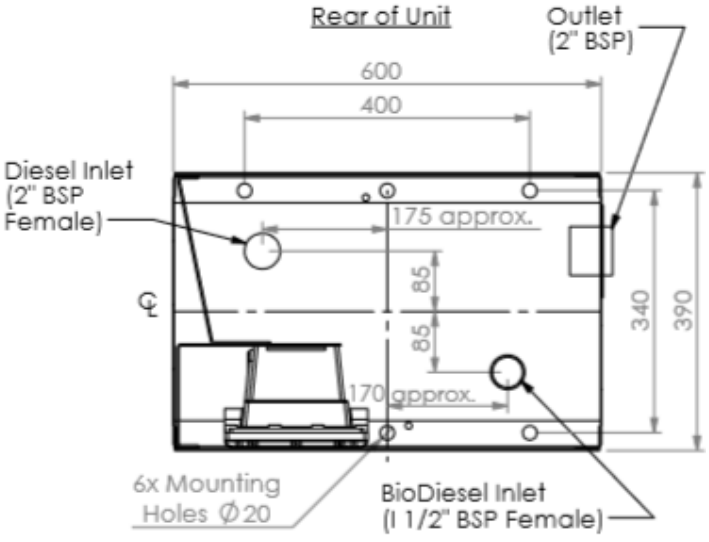
Footprint Plan View

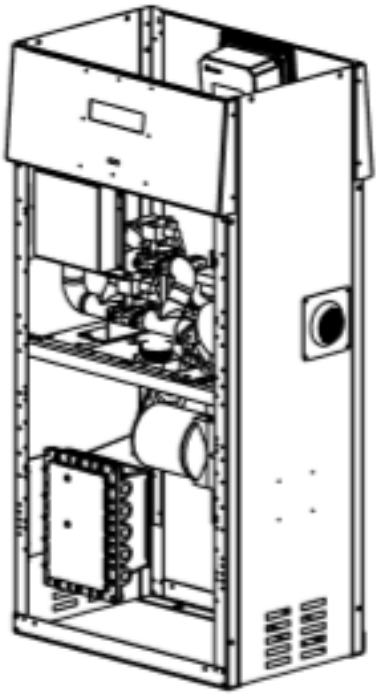


Master PN3 MR400S



Front View





Footprint Plan View

Installation

Refer to your individual pump installation sheets for mounting diagrams.

The two inlets on the base of the dispenser are labelled A and B. Ensure that the inlet A is connected to the (mineral) diesel tank and the inlet B is connected to the bio-diesel tank.

Dispensing Hose and Nozzles

The unit may or may not be supplied with dispensing hose and nozzle assemblies.

The dispensing equipment shall be installed to prevent the delivery hose from contacting the ground when not in use.

If customer supplied hose assemblies, pylons, reels, safe breaks and nozzles are used they must comply with the requirements outlined in AS/NZS 2229

Wiring

For general wiring instructions, refer to the C4000 Master Manual.

On the C4000 Power Supply the motors and solenoids are connected to the following terminals:

- Mineral pump motor is T1
- Mineral solenoids are T2 and T3
- Bio pump is T4
- Bio solenoids are T5 and T6

On the C4000 Board the meters are connected to the following terminals:

- Mineral meter plugs into J3
- Bio Diesel meter plugs into J4

Supply Pumps

The Bioblend gauge must always be 2 PSI higher than the diesel gauge. These can be adjusted by setting supply pumps. The location of the gauges can be seen in Hydraulics (see page 12.)

Hydraulics

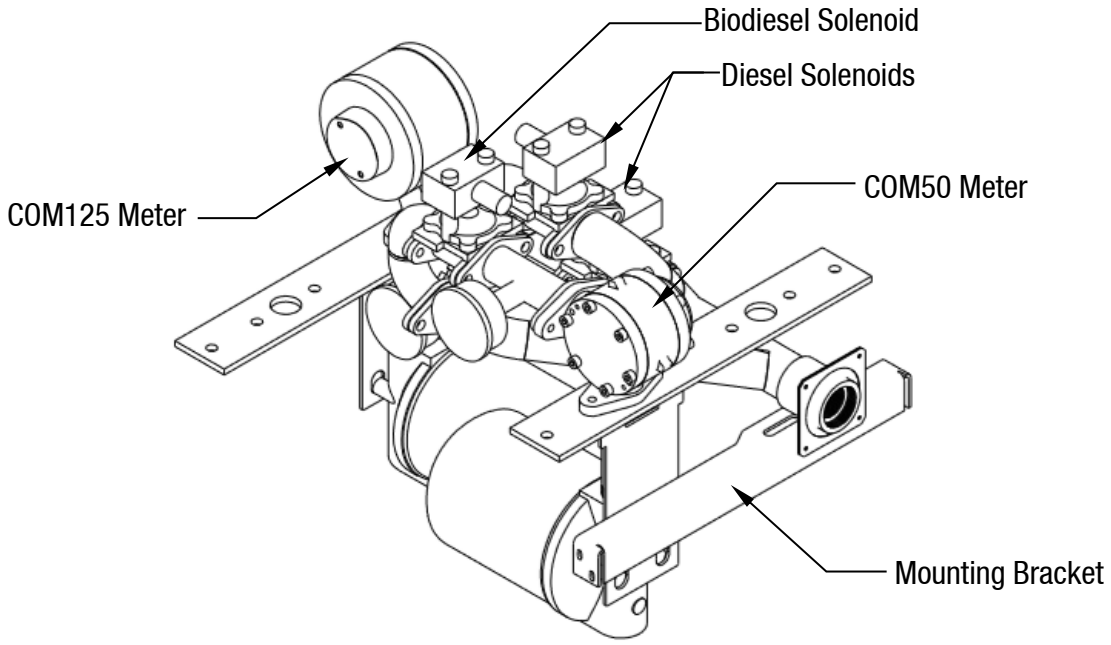
Component	Function
Diesel and Biodiesel gauges	These show the pressure of the supply pumps. Ensure the biodiesel gauge is always 2 psi higher than the diesel gauge.
COM 50, 125, 250 meters	Measure the flow of biodiesel and diesel.
Biodiesel and Diesel filters	Fuel is passed through these before being dispensed.
Solenoids	Provide on/off flow control for both diesel and biodiesel.

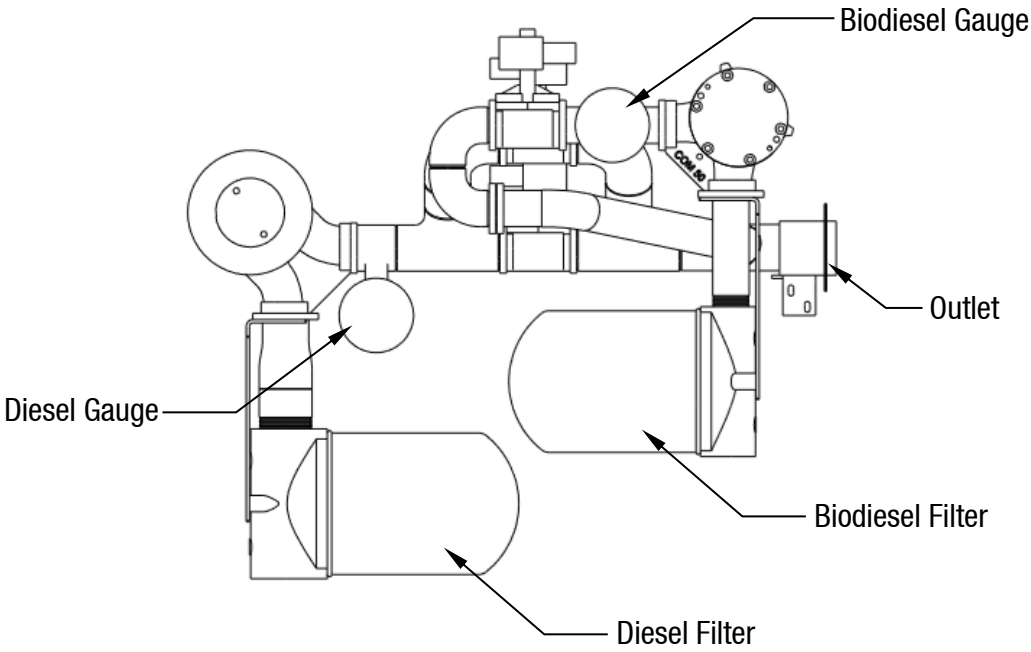
Typical Cycle

The following table describes a typical hydraulic cycle.

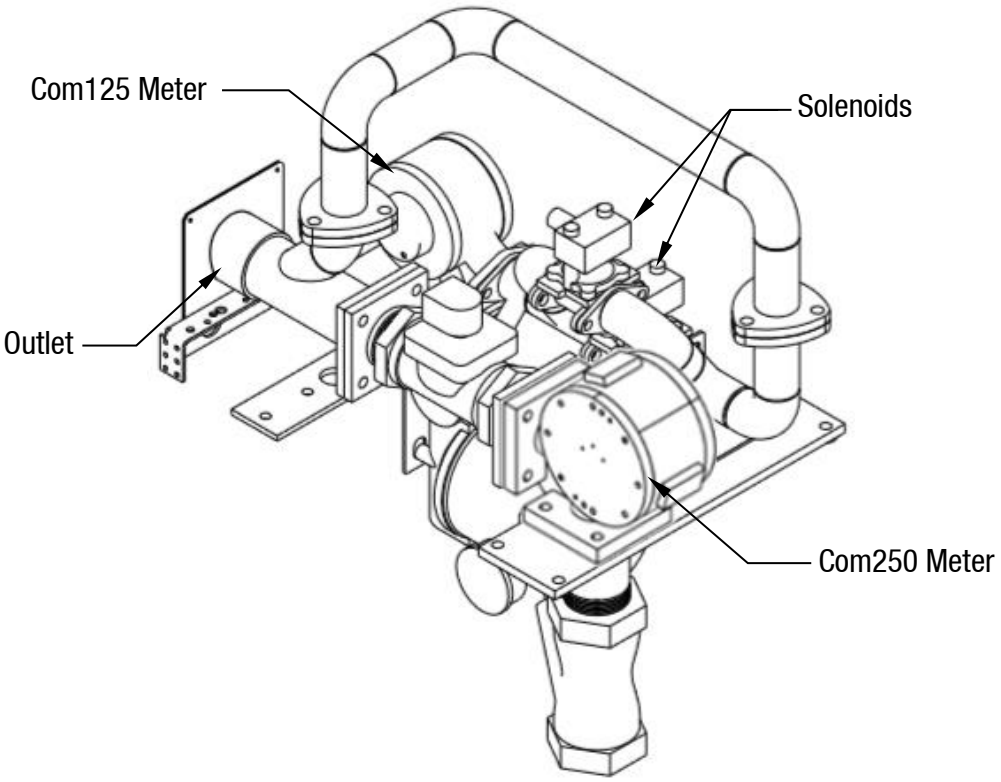
Operator Action	What happens at the dispenser
Lift the nozzle	The C4000 activates the pumps. The solenoids open and the fill commences.
Nozzle lever opened.	Diesel is continuously dispensed, and the biodiesel solenoid pulses on and off to ensure the correct blend ratio is delivered. Fuel flow is metered. After 10 litres is dispensed, the blend ratio is checked, and then continuously monitored. If an incorrect ratio is being dispensed an error will occur.
Nozzle lever closed and nozzle is hung up.	The solenoids close and the pumps stop after the fill has ended.

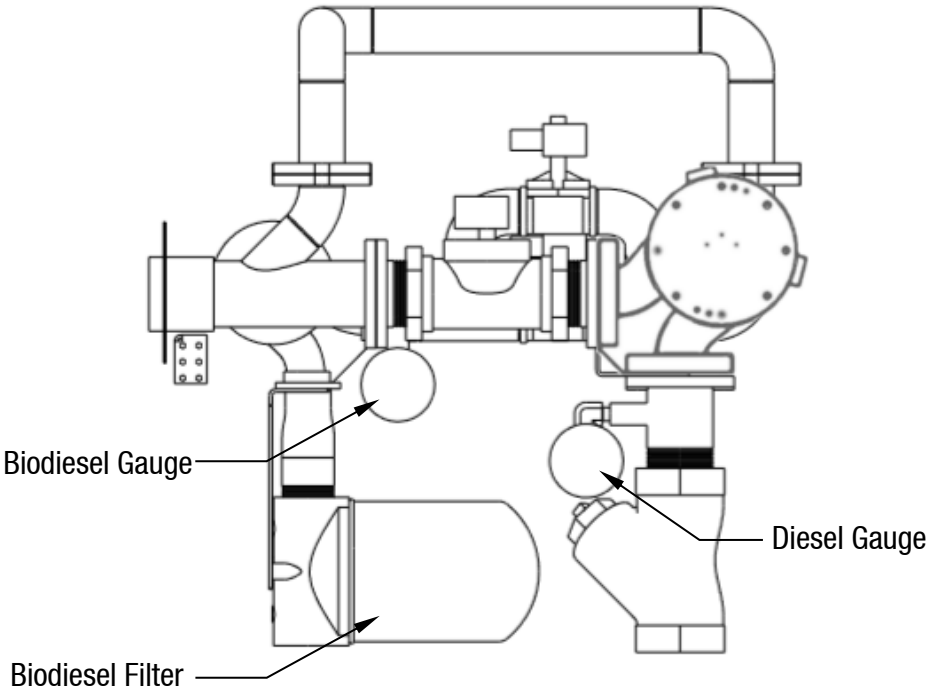
PN3 MR160S


Biodiesel Solenoid
Diesel Solenoids
COM125 Meter
COM50 Meter
Mounting Bracket


Biodiesel Gauge
Outlet
Diesel Gauge
Biodiesel Filter
Diesel Filter

PN3 MR400S


Com125 Meter
Solenoids
Outlet
Com250 Meter


Biodiesel Gauge
Diesel Gauge
Biodiesel Filter

Setting up the C4000

Static Blend

For pumps that are not connected to a card management system, the C4000 must be set up to dispense the correct blend using the Parameter Switch.

Refer to C4000 Master Manual to find the location of the parameter switch.

STEP	ACTION	RESULT
1	Ensure that the nozzle is hung up	Dispenser in idle state
2	Press the parameter switch 9 times	The blend ratio is displayed in the following format: bXX where XX is the current blend ratio percentage. Eg. B20 is a 20% blend.
3	Press and hold the Parameter switch.	The blend ratio number will step up in increments of 5% until the maximum ratio of 40% is reached. If the parameter switch is held after this, the ratio will return to zero and start stepping up again.
4	When the ratio is correct, release the Parameter switch.	After approximately 10 seconds the display will return to the normal dispenser display.

NOTE: *If dynamic (fuel card controlled) blends are used, the set figure will become the default blend setting if the fuel card does not have a blend ratio set.*

Dynamic Blend

Set the default bio-fuel blend ratio if required.

In your card files use the "Owner Details 1" column to manage the individual blend ratios using the following format: BXX where XX is the percentage bio-diesel to diesel blend required. Eg. B25 is a 25% bio-diesel to 75% diesel blend ratio. Blend ratios must be in steps of 5% and between 20 and 40% bio-diesel.

A sample card file is shown below:

	A	B	C	D	E	F	G	H	I
1	Number	Valid	Blend Ratio	Exp Year	Exp Mth	Cost Centre	/Card Number	Reg	Account Number
2	36123013	TRUE	B20	2022	6	5080	456123	ZB3889	712350
3	36123044	TRUE	B35	2022	1	5022	245607	DJF673	712350
4	36123046	TRUE	B40	2022	12	5093	545688	COM175	712350
5	31235049	TRUE	B25	2022	10	5093	567868	AGG125	712350
6	36123050	TRUE	B20	2021	12	5030	289608	APA405	712350
7	36123054	TRUE	B30	2022	12	5093	556720	GAC240	712350
8	36434557	TRUE	B20	2021	7	5093	154314	CAF815	712350

Calibration

To calibrate a BioBlend dispenser use the following procedure:

Refer to C4000 Master Manual for detailed instructions.

1. Change the B configuration to b0000 as it will be set to inhibit standalone. (b1000 is standard)
2. Change the C config to be C00001
3. Disconnect the communications from the FMS board or simply turn off the power switch in the ComFutra head and then re-power the pump to put it into standalone mode
4. Calibrate the Mineral side of the dispenser using the normal calibration procedures. Refer to C4000 manual.
5. Change the C Config to be C00002
6. Calibrate the mineral side of the dispenser using normal calibration procedures
7. Change the C Config to C00003 to enable the blend
8. Check the Blend is set to 20% in the B config (b20)
9. Do a couple of test fills and confirm you get a 20% blend. This can be done by filling a 20L pail and then checking after the fill that approx 4 litres of bio-fuel is shown in the Litres display by using the Last Sale Value function of the Parameter menu.
10. Change the B configuration back to b1000 to re-enable inhibit standalone, reconnect the comms and turn on the ComFutra head.
11. Wait a few minutes for the ComFutra to boot up then do a test fill or two using a card to confirm that the dispenser is working correctly and you are still getting the correct blend ratio.

Calibration Codes

NOTE: *All other C config codes are disabled.*

Code	
C = 00001	Calibration mode – Meter side A
C = 00002	Calibration mode – Meter side B
C = 00003	Blend mode – Both meters

Error Codes

See the following table for error codes for the unit. Some codes will have a prefix ‘A’ or ‘B’ depending on the side. A indicates an error on the mineral fuel side, and B indicates an error on the bio diesel side.

Error Code	Fault	Action
Err 3	No price or pump number set.	Set the pump number or: Set a price at the pump or at the controller.
Err 7	Excess flow.	Max Flowrate exceeded.
Err 8	Excess reverse rotation of encoder.	Check product is not flowing back into the tank once the delivery has finished.
Err 9	Faulty or disconnected meter encoder.	1. Check that encoder is plugged in. 2. Replace encoder PCB on meter.
Err 10	Configuration Lost.	Reconfigure C4000. Refer to C4000 manual.
Err 12	C4000 memory failure.	Change memory IC. F-AD-DS1225 (not applicable to Futra.)
PEd Abd	Display error.	1. Check display cable for loose wires/crimps. 2. Replace display PCB.
A ir	Air detected in the system	Air purge is required
bLEnd	The pump is not able to deliver the blend, or the blend percentage being delivered differs more than 3% from the requested ratio	Check all supply valves and fuel levels. Re-authorise the pump and attempt another delivery

Installation Checklist

When a new unit is being installed use the following checklist to make sure the unit is fully operational. Check each box or write N/A where not applicable. Refer to the relevant installation manual for procedures.

Mechanical Checks	Yes	No
Check unit is undamaged and has not been tampered with.		
Is the unit in a sheltered position and facing away from the prevailing wind and rain?		
Check all panels are securely fastened using tamper-proof fastenings where supplied.		
Check that all cable entries to unit are through glands.		

Power on Checks	Yes	No
Check that the CE board, FMS board, pinpad, printer, cardreader, router and modem all power up.		
Check pumps are re-priced to the current fuel price.		
Check that different fuels are correctly priced on all hoses.		

Transaction Checks	Yes	No
Complete transaction using white card/CWID/HID/Pin authorisation methods		
Complete transaction using credit card (credit card DCA only).		
Check that all hoses can be selected and authorised by the unit.		
Check all hoses stop on or before the pre-authorised value (credit card DCA only).		

Receipt Checks (where fitted)	Yes	No
Check that the correct $, L and fuel grade are printed on the receipt.		
Check the date, time and header information is correct.		

USB Module Checks (where fitted)	Yes	No
Check the supplied USB key is recognised by the unit.		
Select "Get Transactions" and check that transactions are uploaded to the USB key.		

CompacOnline Checks (where fitted)	Yes	No
Check the site appears on CompacOnline.		
Check that transactions have been recorded on CompacOnline.		

Tank Gauging Checks (where fitted)	Yes	No
Check that tanks are set up in CompacOnline and that correct levels are being reported.		
Check that the correct products are assigned to the correct tanks.		

Customer Training	Yes	No
Check site attendants understand refuelling procedures.		
Check that site administrators understand how to obtain transactions and administer cards.		

Final Checks	Yes	No
Ensure all cables are plugged back in after remote accessing.		
Tidy up all rubbish and clean the exterior of the unit before leaving.		

Report any damage immediately to Compac Industries on: +64 9 579 2094. Any site safety issues should be reported immediately to the site manager.

Notes
