



***compac***

***PREMIUM DISPENSER TECHNOLOGY***

# **Master C5000 Pumps Installation Manual**

## **Version No 1.0.4**

**Model:** Master C5000 Pumps

**Date:** 20<sup>th</sup> May 2022



## 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.
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- 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.
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- 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.
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## Product Identification

### Specifications

#### Models Covered

This manual applies to:

MR40P (std, marine and aviation)  
MR80P (std, marine and aviation)  
MR160P (std, marine and aviation)  
MMR40P (std, marine and aviation)  
MMR80P (std, marine and aviation)  
MMR80-40P (std, marine and aviation)

**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:

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## Document Control

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<b>Authorised By</b>	E Sione

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1.0.0	26/03/2019	S Laycock	New Manual – updated from C4000 manuals
1.0.1	16/06/2020	V Amarakoon	Updated Installation. Added Above ground tank Installation
1.0.2	02/07/2020	V Amarakoon	Changed the manual title
1.0.3	30/07/2020	V Amarakoon	Updated the COMMS board
1.0.4	20/05/2022	T Watt	Updated footprints Added Aviation footprints

# Contents

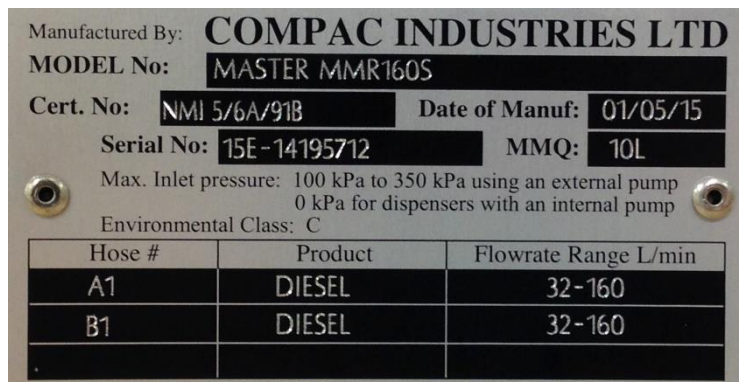
Product Identification .....	1
Footprints .....	2
Optional Flexi Coupling .....	2
MASTER PN4 MR80P & MR40P Pump (includes 'Marine' variants) .....	3
MASTER PN4 MR40P MR80P Aviation Pump.....	4
MASTER PN4 MR160P Pump (includes 'Marine' variants) .....	5
MASTER PN4 MR160P Aviation Pump .....	6
MASTER PN4 MMR40P MMR80P MMR80-40P Pump(includes'Marine'variants)	7
Installation .....	8
Static Electricity Precautions .....	8
Pre-installation Check .....	8
Procedures .....	8
Dispensing Hoses and Nozzles .....	11
Typical Wiring .....	12
Incoming Mains.....	13
Comms Connections .....	14
K-Factor Board .....	15
Setting up the C5000 .....	16
K-Factor Settings .....	16
Parameter Settings .....	18
Notes .....	20
Pump Controller .....	20
Spare Fuses .....	20
Precautions if Using Generator Power .....	20
Error Messages .....	21

## Product Identification

Ensure you are using the correct installation instructions and footprint drawing before commencing site work or installation.

The identification plate is fastened to the bottom of the right-hand side panel when facing the front of the dispenser.

The model number is on the first line of the identification plate.



### Understanding the model number:

The model number for Master pumps is split into: Chassis style, hose configuration, pump or dispenser and specific application.

Use the table below to help identify the unit.

Style	L/min per hose	Pump style	Options
MR = single hose	MR40 = one hose @ 40 l/min	P = pump	Blank = Standard
MMR = multi hose	MMR40 = two hoses @ 40 l/min	S = dispenser	Avi = Aviation
	MMR80-40 = side A 80, side B 40		Marine = Marine

For example: MMR 80-40P Marine is a two-hose unit. Hose side A is 80 l/min, side B is 40 l/min with internal pumps. As a marine model it has stainless steel pipework and stainless-steel chassis for marine conditions.

**NOTE:** Make sure you use the footprint that relates exactly to your model refer to sales order for any variations to the standard setup.

## Footprints

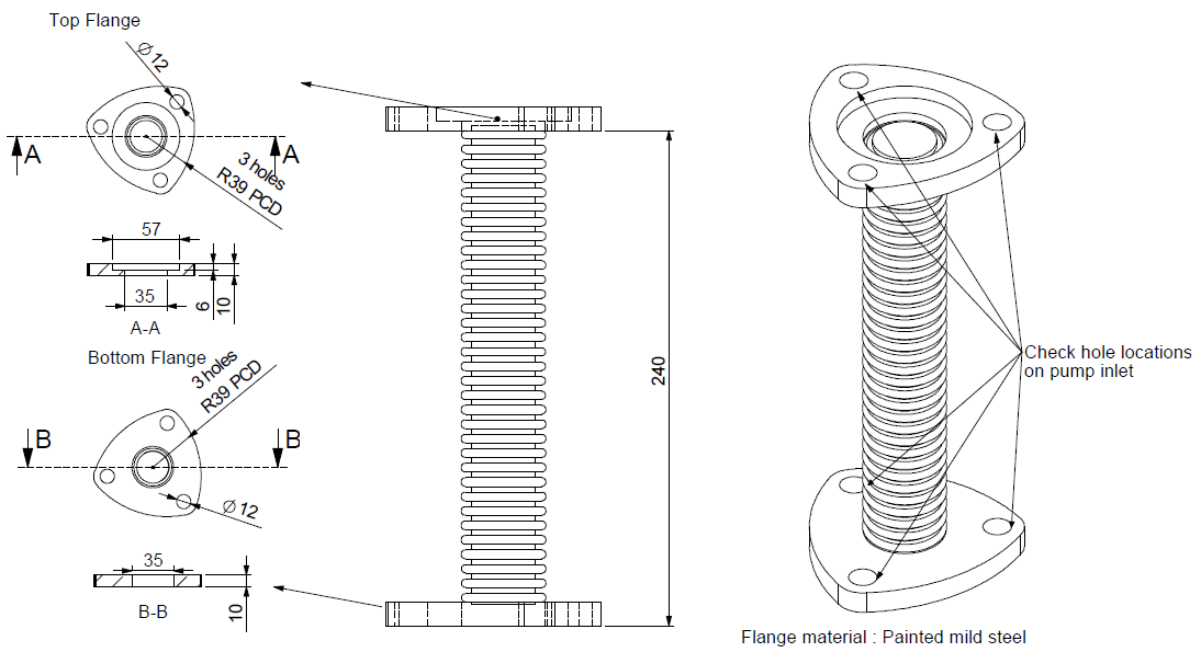
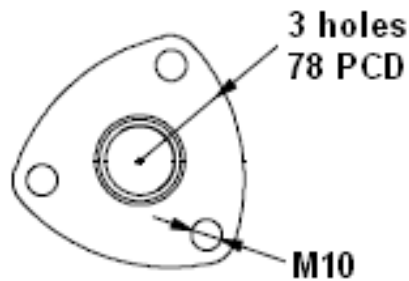
All outlets are approximately 680mm above the base:

- 40 l/min - 3/4" female BSP socket
- 80 l/min - 1" female BSP socket
- 160 l/min - 1 1/4" female BSP socket

Inlet pipework can be connected to the pump flange(s). An optional flexible coupling is offered by Compac. There must be no fuel pressure in the pump line when pump is not operating.

## Optional Flexi Coupling

### Pump Flange



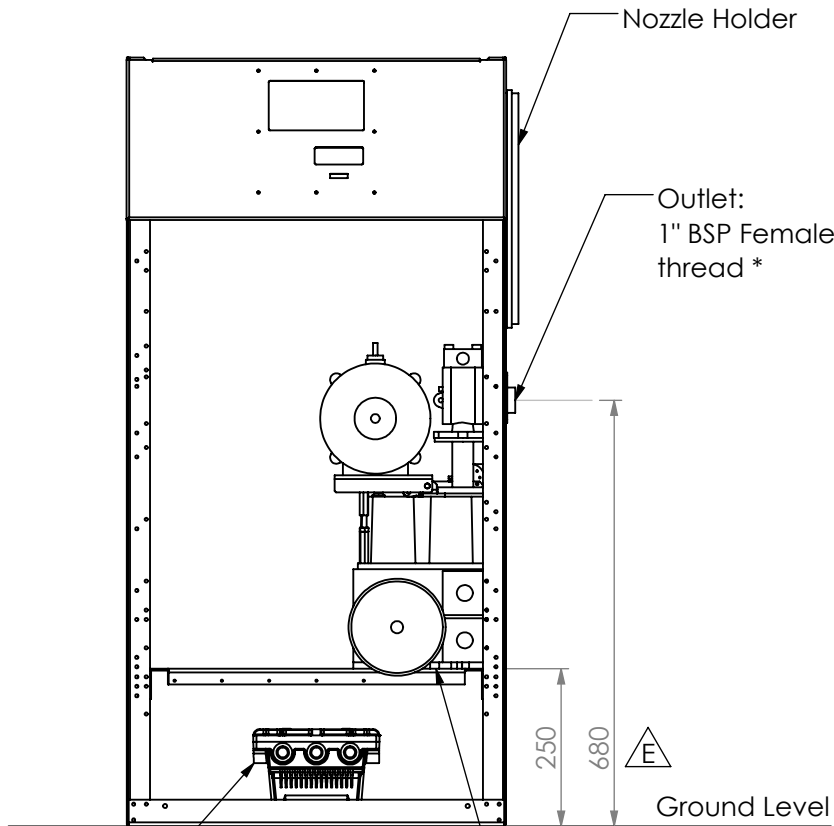
\* NOTE: For a "MR40P" unit a 1" BSP Male to 3/4" BSP Female Reducer is fitted to the Outlet.

Approved for Manufacture:

Signed / Date:

Title:

C5000 K-Factor Board is located in the "Front" Display Enclosure

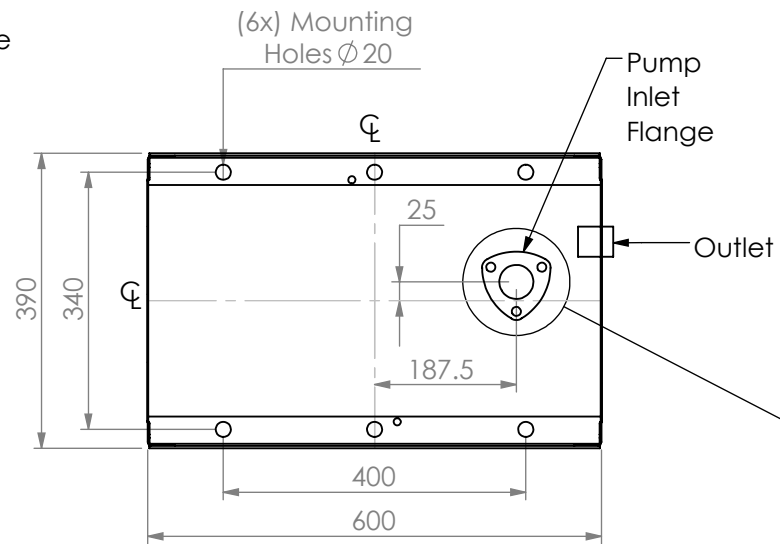


C5000 Junction Box. Bring incoming Mains & Comms cables into here.

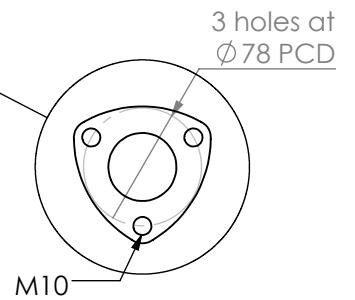
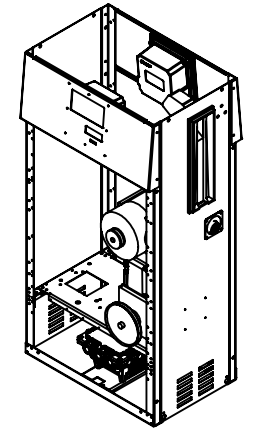
**Front View**

Contractor to supply & install pipework to connect to this flange.

**Rear of Unit**



**Front of Unit  
Footprint Plan View**



**"3 bolt" Triangular Pump Flange**

Date: 19/05/2022

Revision Description: Edit dimension



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**General Tolerances**  
All dimensions millimetres

Remove all burrs and sharp edges. Original Size A4. Do not scale from drawing.



**Master PN4 MR80P & MR40P Pump Footprint Drawing (Includes 'Marine' variants)**

Drawing  
MAD0123E

Sheet  
**1/1**

Part Revision  
**A**



\* NOTE: For a "MR40P" unit a 1"BSP Male to 3/4"BSP Female Reducer is fitted to the Outlet.

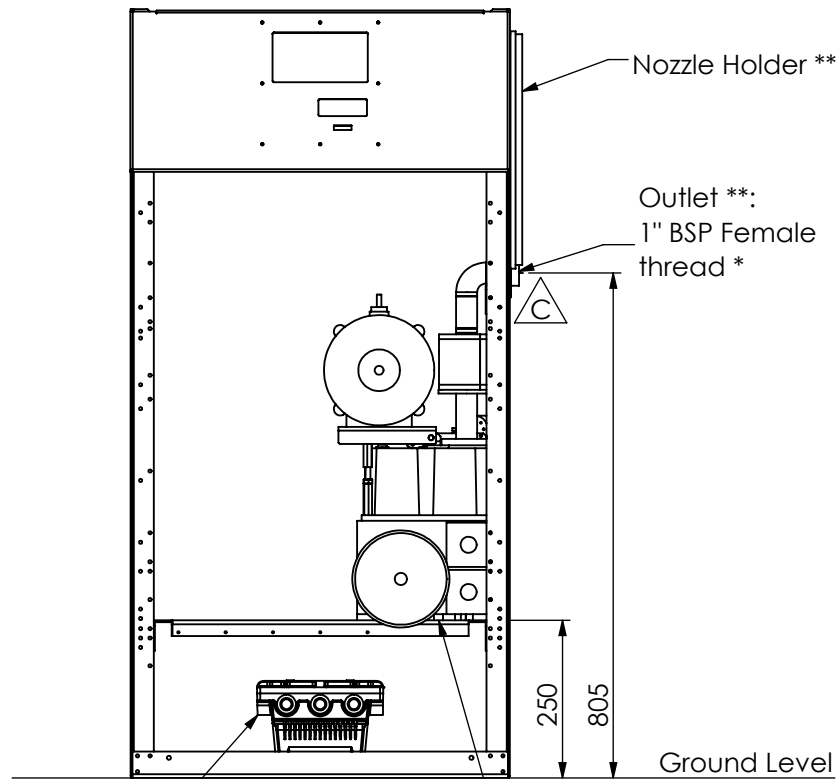
\*\* NOTE: Nozzle Holder & Outlet may be positioned on 'opposite' ends.

Approved for Manufacture:

Signed / Date:

Title:

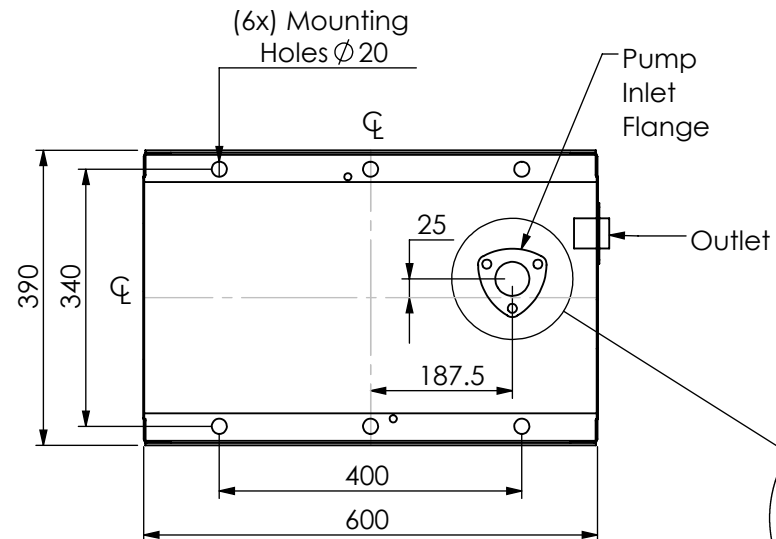
C5000 K-Factor Board is located in the "Front" Display Enclosure



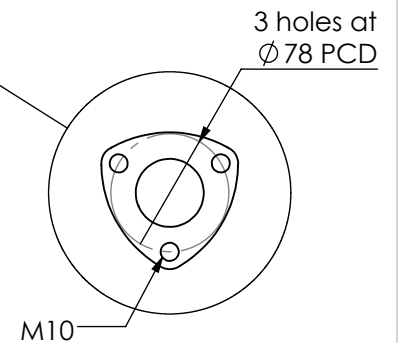
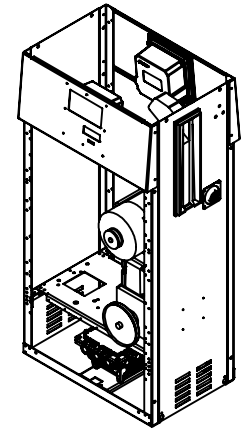
C5000 Junction Box. Bring incoming Mains & Comms cables into here.

**Front View**

**Rear of Unit**



**Front of Unit  
Footprint Plan View**



**"3 bolt" Triangular Pump Flange**

Date: 13/05/2022

Revision Description: Add Outlet Support Brkt to Model



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**General Tolerances**  
All dimensions millimetres

Remove all burrs and sharp edges. Original Size A4. Do not scale from drawing.



**Master PN4 MR80P & MR40P  
Aviation Pump  
Footprint Drawing**

Drawing  
MAD0175C

Sheet  
**1/1**

Part Revision  
**B**

Approved for Manufacture:

Signed / Date:

Title:

C5000 K-Factor Board is located in the "Front" Display Enclosure

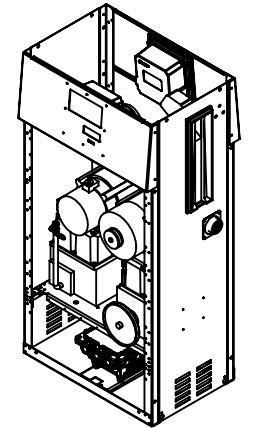
Nozzle Holder

Outlet:  
1 1/4" BSP  
Female  
thread.

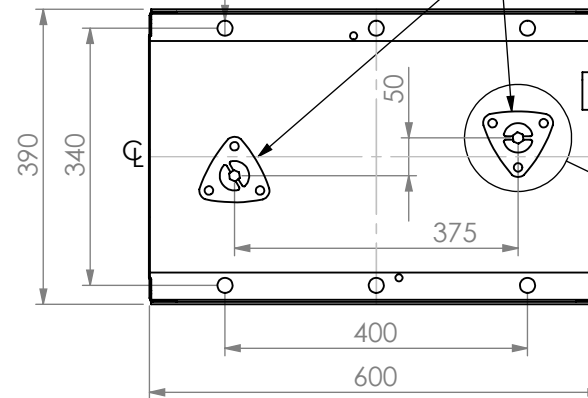
**Rear of Unit**

(6x) Mounting  
Holes  $\varnothing 20$

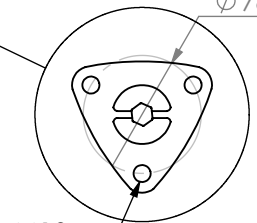
**Dual Inlets**  
(both Pumps  
feed the one  
Outlet)



Outlet



3 holes at  
 $\varnothing 78$  PCD



**"3 bolt" Non-return Valve** (to be fitted to each Pump Inlet Flange)

**Front of Unit**

**Footprint Plan View**

Ground Level

210  
250  
680

**Front View**

C5000 Junction Box. Bring incoming Mains & Comms cables into here.

Contractor to supply & install pipework to connect to the two "supplied" "Non-return" Valves.

Date: 11/05/2022

Revision Description: Edit Drawing Title



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**General Tolerances**  
All dimensions millimetres

Remove all burrs and sharp edges. Original Size A4. Do not scale from drawing.



**Master PN4 MR160P Pump Footprint Drawing (Includes 'Marine' variants)**



Drawing  
MAD0125D

Sheet  
**1/1**

Part Revision  
**A**

\*\* NOTE: Nozzle Holder & Outlet may be positioned on 'opposite' ends.

Approved for Manufacture:

Signed / Date:

Title:

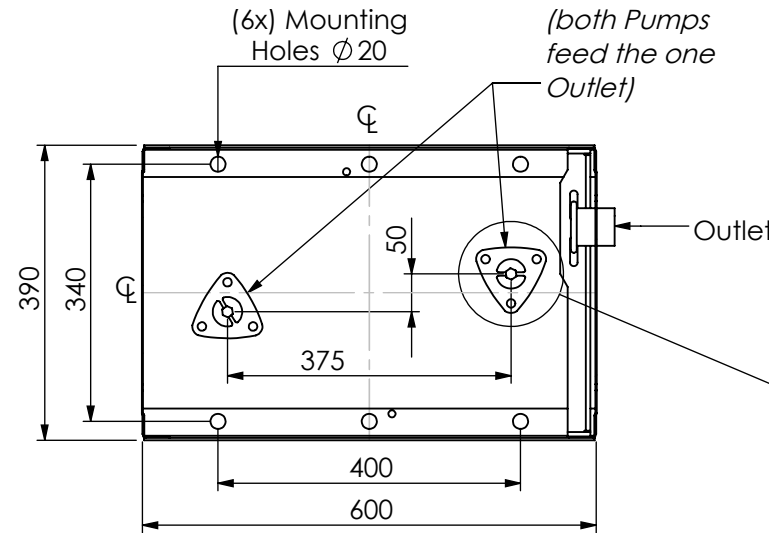
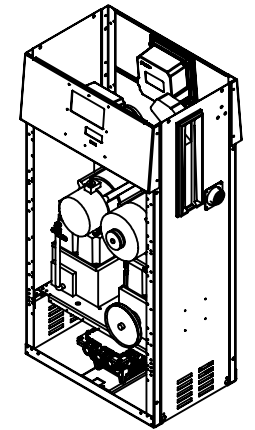
C5000 K-Factor Board is located in the "Front" Display Enclosure

Nozzle Holder \*\*

Outlet \*\*: 1 1/4" BSP Female thread.

**Rear of Unit**

**Dual Inlets**  
(both Pumps feed the one Outlet)



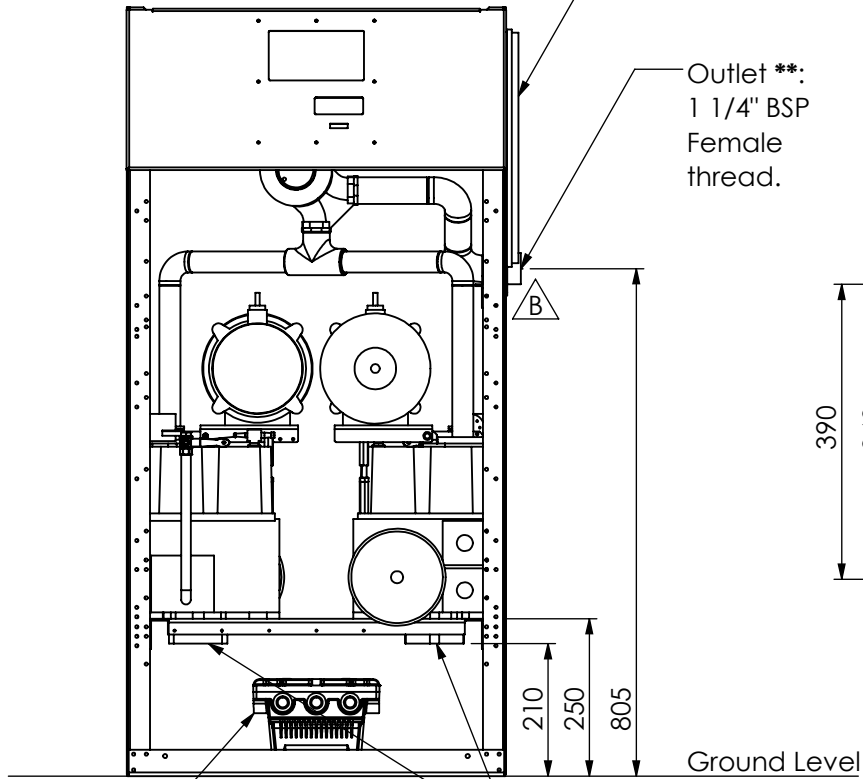
**Front of Unit**

**Footprint Plan View**

3 holes at Ø 78 PCD

M10

**"3 bolt" Non-return Valve** (to be fitted to each Pump Inlet Flange)



**Front View**

C5000 Junction Box. Bring incoming Mains & Comms cables into here.

Contractor to supply & install pipework to connect to the two "supplied" "Non-return" Valves.

Date: 13/05/2022

Revision Description: Add Outlet Support Brkt to Model



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**General Tolerances**  
All dimensions millimetres

Remove all burrs and sharp edges. Original Size A4. Do not scale from drawing.



**Master PN4 MR160P Aviation Pump Footprint Drawing**

Drawing  
MAD0176B

Sheet  
**1/1**

Part Revision  
**B**

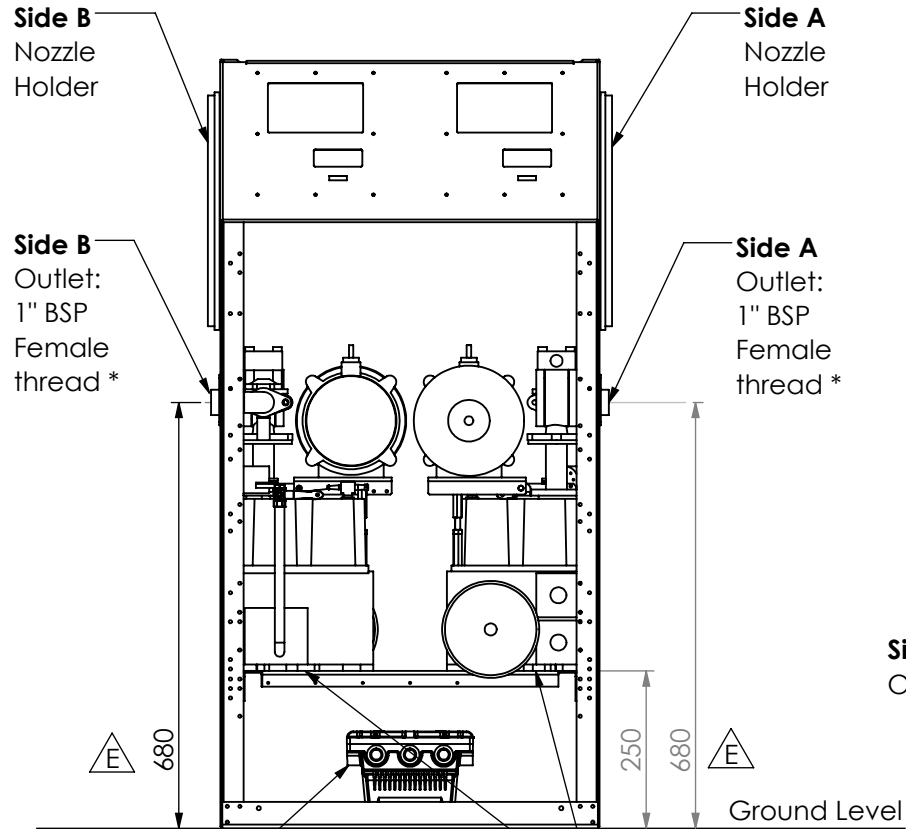
\* NOTE: For a "MMR40P" unit a 1"BSP Male to 3/4"BSP Female Reducer is fitted to both Oulets.  
 \* NOTE: For a "MMR80-40P" unit a 1"BSP Male to 3/4"BSP Female Reducer is fitted to one Outlet.

Approved for Manufacture:

Signed / Date:

Title:

C5000 K-Factor Board  
 is located in one of the  
 "Front" Display Enclosures

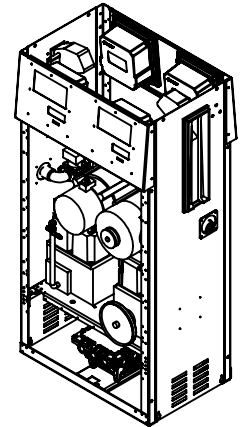
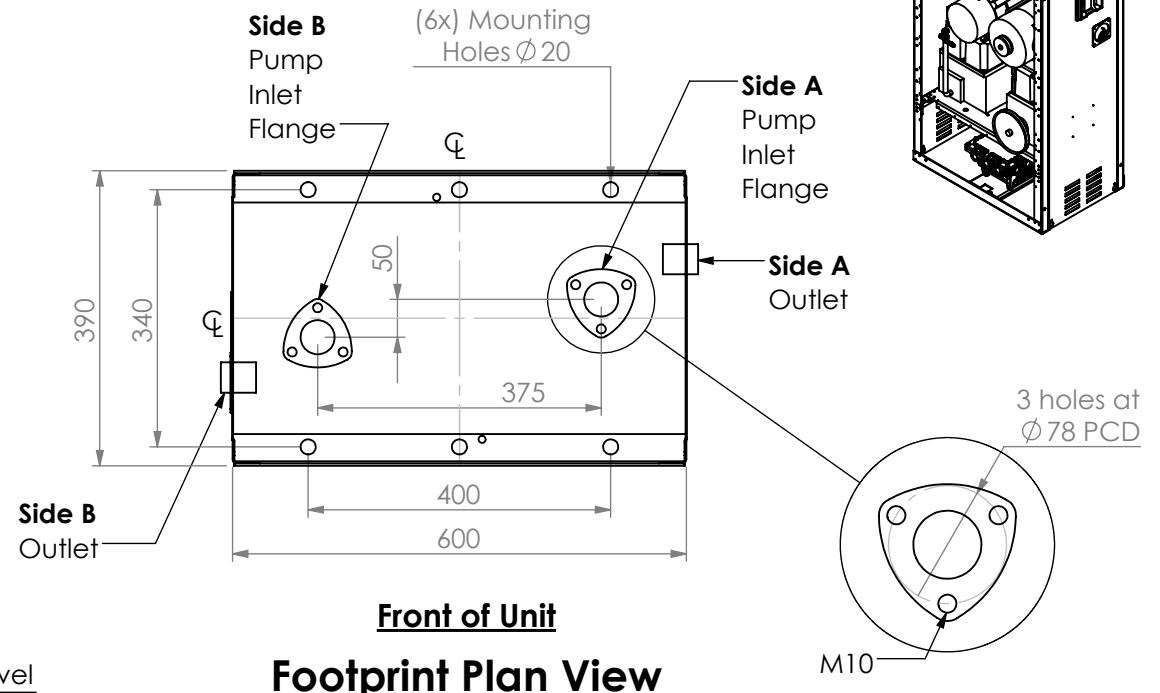


C5000 Junction  
 Box. Bring incoming  
 Mains & Comms  
 cables into here.

**Front View**

Contractor to supply  
 & install pipework to  
 connect to these two  
 flanges.

**Rear of Unit**



Date: 19/05/2022

Revision Description: Amend dimensions



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**General Tolerances**  
 All dimensions millimetres

Remove all burrs  
 and sharp edges.  
 Original Size A4.  
 Do not scale  
 from drawing.



**Master PN4 MMR80P, MMR40P &  
 MMR80-40P Pump Footprint Drawing  
 (Includes 'Marine' variants)**

Drawing  
 MAD0124E

Sheet  
**1/1**

Part Revision  
**A**

## Installation

### Static Electricity Precautions

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

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.

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

### Pre-installation Check

Once the pump is received on site, check that no damage has occurred while in transit – in particular, damage to electronics due to vibration or jarring. All terminals and plugs should be checked, including IC chips, to ensure they are securely in place.

### Procedures

Installation should be in accordance with local regulations.

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

#### Below Ground Tank Installations

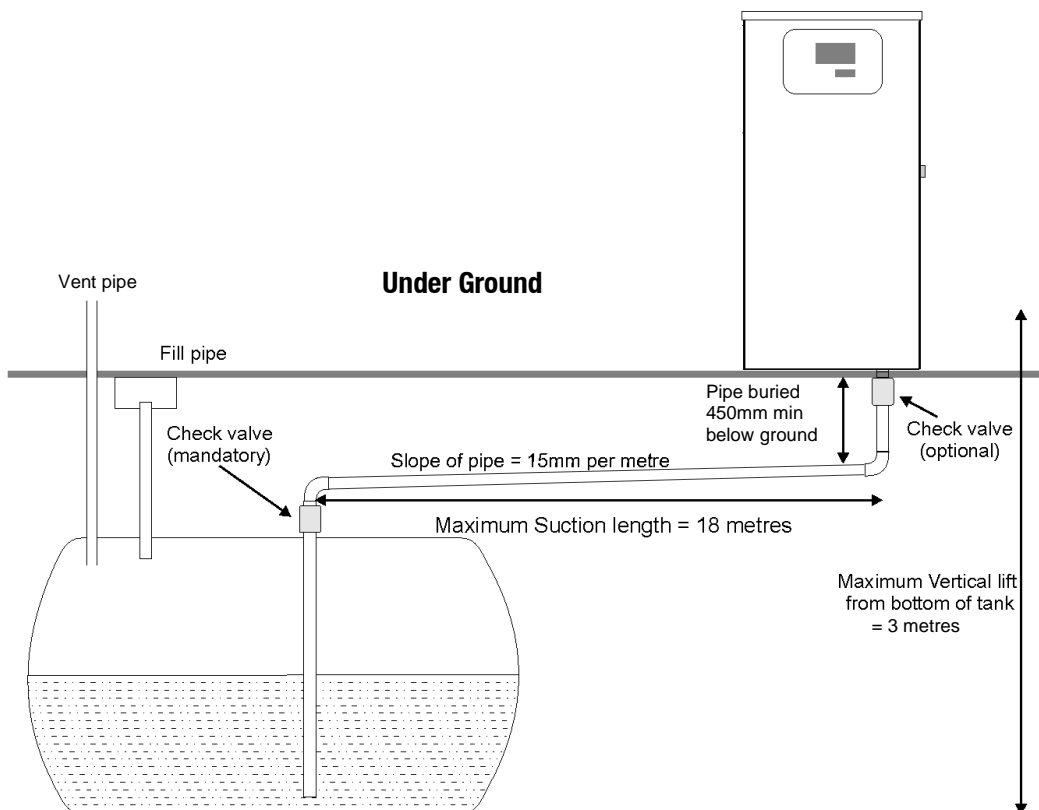
1. Pumps must not be subject to any head pressure. Design your installation to eliminate any possibility of this occurring.
2. Total length of horizontal piping between tank and pump should be no longer than 18 metres. Use galvanised steel or approved non-metallic pipe and fittings.
3. If the unit contains two pumps. It is recommended that each pump is supplied by a separate pipe. The common sizes used are.
  - 40 l/min pumps, use 1½" pipe
  - 80 l/min- 160l/min pumps, use 2" pipe.
  - 400l/min pump use 3" pipe.
4. Check valves must also be installed below each pump inlet.
5. On 160lpm units, if a single 3" Suction line is used, Check valves must be fitted to the inlets of both pumps to prevent one pump drawing product back through the other

**NOTE:** *Ensure you remove the bung from the pump inlet before connecting the pipe.*

6. Pipe must slope up from the tank to the pump (approximately 15 mm per metre). Pipe should be straight and supported along its length.
7. All horizontal piping must be buried at least 450mm below ground level.

8. 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.
9. Avoid asphalt drive surfaces covering the piping. Asphalt increases heat absorption causing vapour lock.
10. Static lift must not exceed 3 metres (vertical distance from the product level in the tank to the centre of the pump unit).
11. 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.
12. Piping must hold a 3.4 Bar (50PSI) pressure test for a minimum of 10 minutes.
13. It is recommended that a vertical, in-line check valve be installed underneath the pump.
14. The dispensing equipment shall be installed to prevent the delivery hose from contacting the ground when not in use.
15. A check valve must be installed at the tank end of the suction pipe 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.

Refer to the footprint drawings for pump installation details.



## Above Ground Tank Installations

If a regulator valve is not installed correctly product will pour out of the pump breather. If this happens do not plug the breather. Review the installation and ensure that all the following requirements have been met.

The regulator valve must be mounted in the vertical position and directly underneath the pump. Do not mount alongside the pump as no pipework between the regulator valve and the pump is allowed to be below the regulator valve itself.

Do not plug the vent on the regulator valve. Pipe the vent back to the top of the tank or vent to atmosphere.

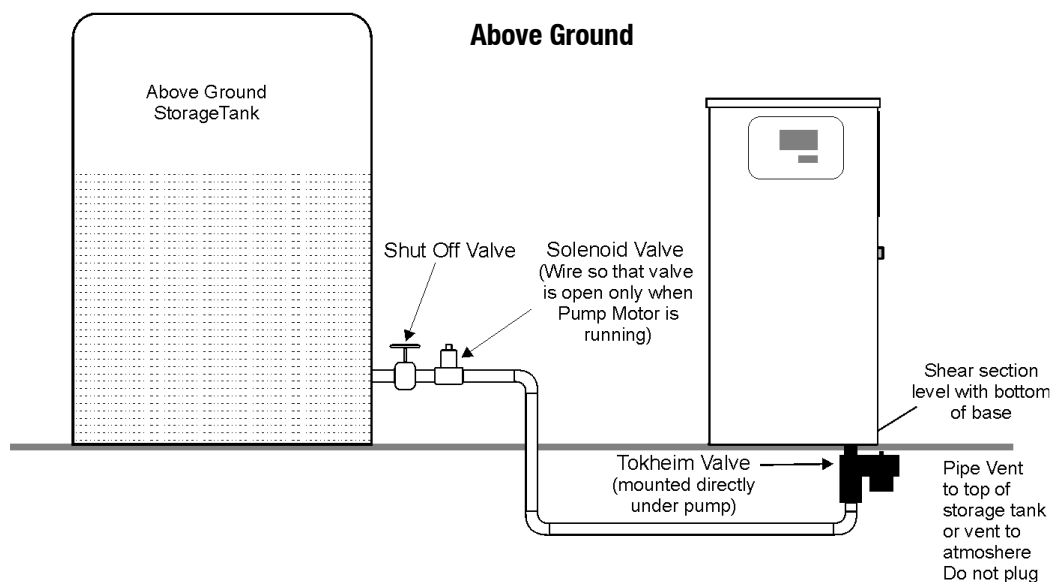
Maximum working pressure of fuel system = 50 psi / 3.4 bar

The installation must include a thermal expansion relief valve. Thermal expansion can cause pressures in the system greater than 50 psi / 3.4 bar and can result in failure of the valve and loss of product to the environment.

The installation must also include a solenoid valve positioned adjacent to the shut off valve at the tank. Its purpose is to prevent loss due to failure of the downstream piping or the system. The recommended solenoid is the Parker 2" type E321G4010 (available from Compac)

The Shear section of the regulator valve should be located level with the bottom of the cabinet base.

The installation must include a shutoff or gate valve to close the system and prevent loss when the equipment utilized in the fuelling system downstream from the above ground storage tank is being serviced or replaced.



Where local regulations require a sump to be fitted:

- a. Sumps must be provided at all dispenser installations with secondary containment pipework and at all new installations.
- b. At all sites with sumps, dispensers should be installed with a liquid level detection device fitted in the sump that will raise an alarm if liquid is detected in the base of the sump.

**DANGER:** 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.

**DANGER:** 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.

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

**CAUTION:** When a 52a valve is installed at the pump, never install a vacuum anti-syphon valve at the top of the tank. An electric solenoid valve is required

## Dispensing Hoses and Nozzles

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

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

## Breakaways

For all dispensers fitted with breakaways, ensure the breakaway is installed between the nozzle and the high-mast or pylon (if fitted). Any breakaways that have been subject to a break-away situation should be inspected and refitted or replaced in accordance with the original manufacturer's instructions.



## Typical Wiring

The instructions below refer to basic installation wiring. Prior to pump installation ensure that there is at least a two-metre tail on both the incoming underground mains supply cable and comms cable (if comms enabled). These cables are terminated at the C5000 power supply, which is housed in the flameproof enclosure located in the bottom of the pump, behind the door.

Mains power wiring should be rated for a maximum current draw of 10 A rms at 220-240 V ac.

The incoming cables are terminated as shown in the following picture.

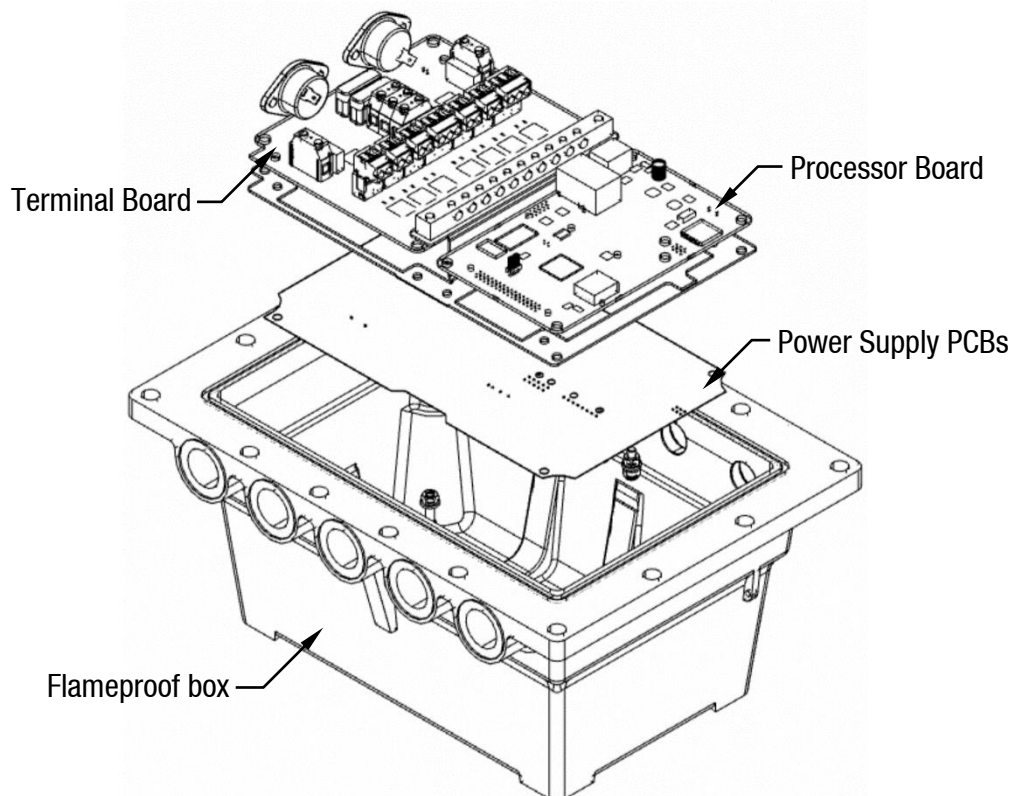
Refer to AS/NZS 60079.14 for appropriate cabling.

**NOTE:** All cables entering the power supply must be glanded with certified 20mm flameproof glands.

**NOTE:** Comms cable is not intrinsically safe.

**NOTE:** Pump comms connects to pump controller such as DCA, Communicator Controller etc. (option).

When replacing the lid of the flameproof enclosure, ensure the sealing O ring is in place.



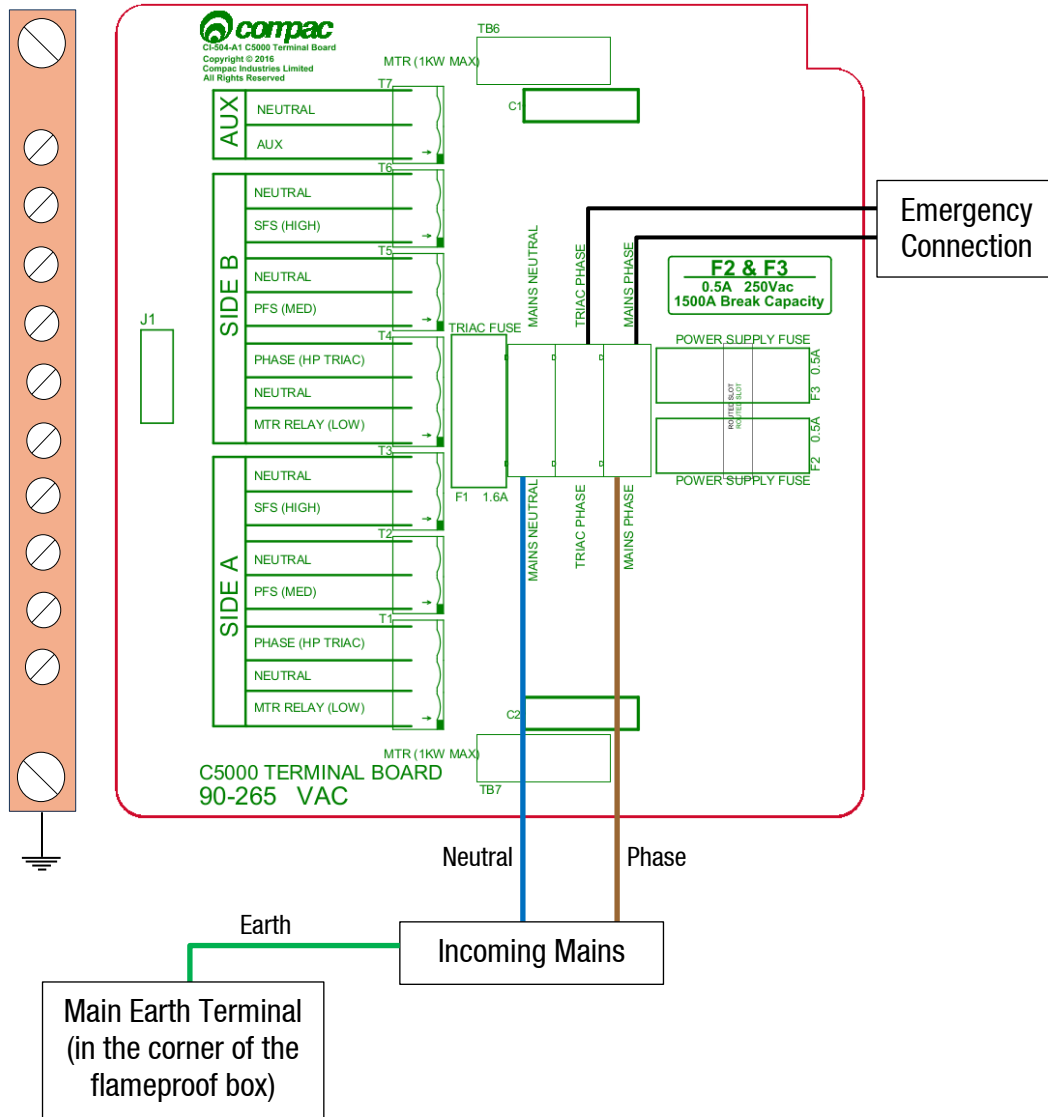
## Incoming Mains

Incoming mains connections should be brought in to the terminal board.

If an emergency stop button was ordered with the dispenser it will be factory wired into the terminal board, shown below. This will be in place of the normal loop between the triac and main phases.

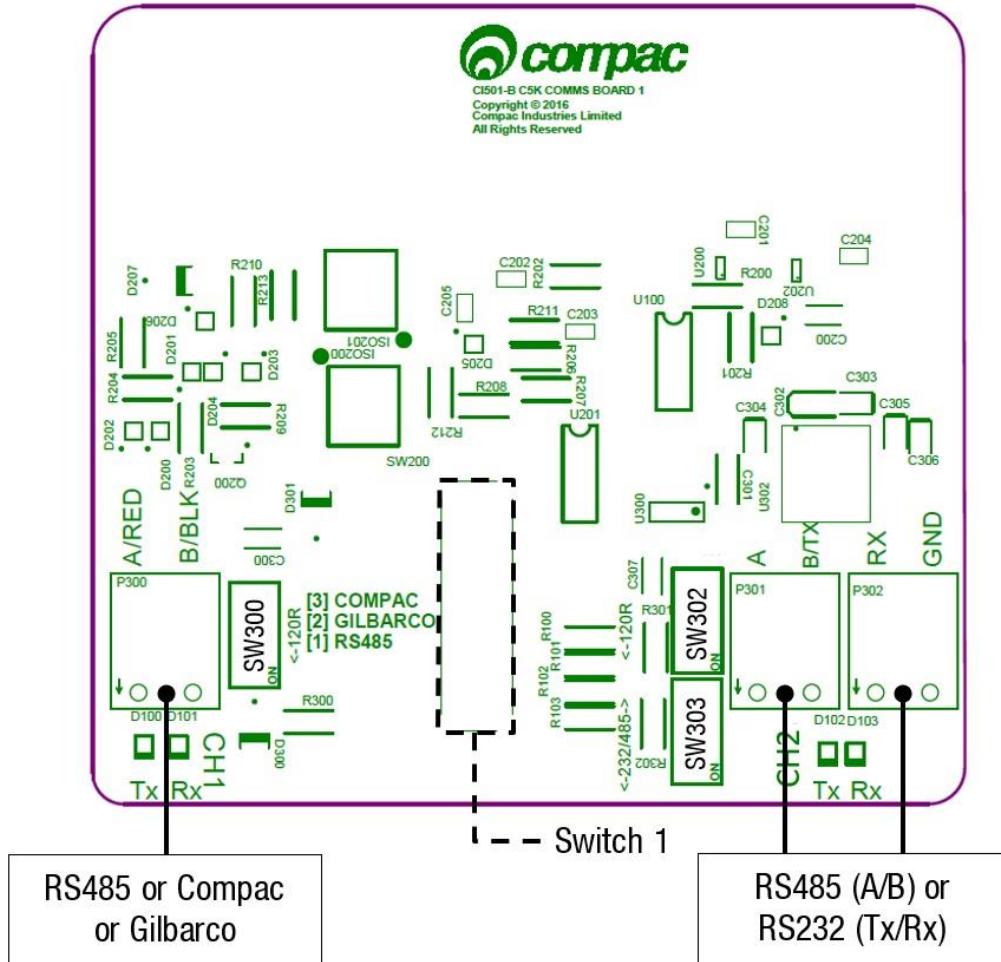
Wires have standard colours which are shown. In case these colours are unclear, they are as follows:

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



## Comms Connections

The comms I/O is controlled by the connections to the Comms board. Refer to the following diagram for connecting RS485, RS232, Compac or Gilbarco pumps. The shown switch should be set to the desired setting.



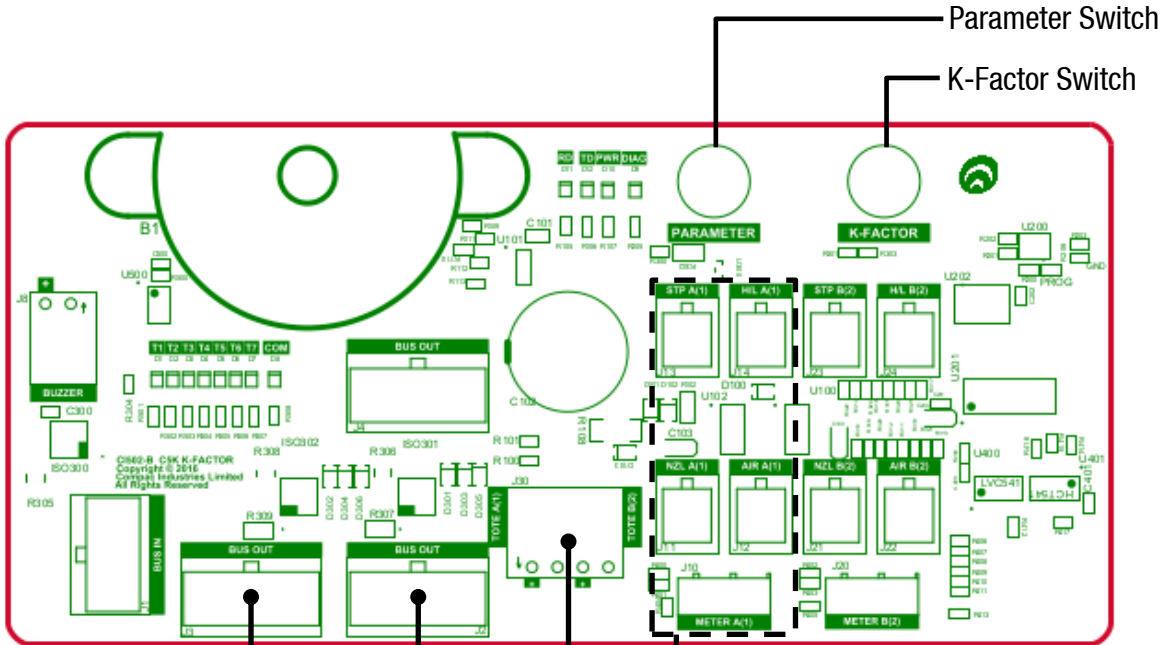
Typical Wiring

Switches 300, 302, and 303 are for RS485/RS232 Terminator application. Use the following table to configure these switches. Switch 300 is for channel 1, and switches 302 and 303 are for channel 2.

	SW300	SW302	SW303
RS485 (Channel 1)	ON	-	-
RS485 (Channel 2)	-	ON	OFF
RS232 (Channel 2)	-	OFF	ON

## K-Factor Board

Both the Parameter switch and K-Factor switch are found on the K-Factor board. Meters and air switches are also connected to this board. See below for the location of these.



Bus out system cables

Connect optional mechanical totes to here

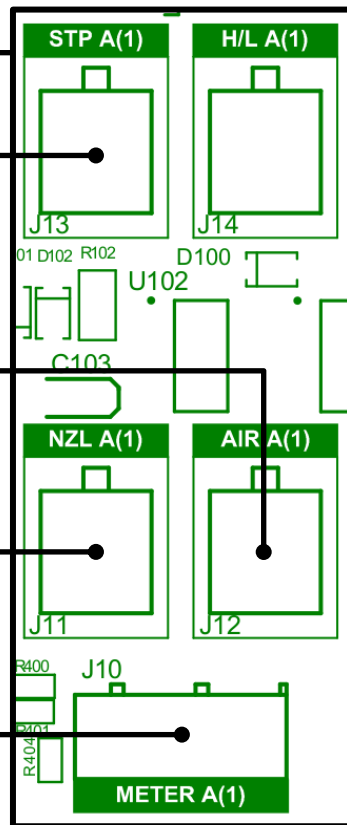
Side A Connections

Connect Sump Switch to here

Connect Air Switch to here

Connect Nozzle Switch to here

Connect Meter to here



## Setting up the C5000

### K-Factor Settings

The settings that can be accessed from the K-Factor switch are shown below. Not all of these will need to be changed during installation, therefore information on the following pages refers only to the settings that must be changed. Once the pump has been installed, if further customisation of the unit is desired, refer to the C5000 Master Manual.

Setting	Price display	Litres display
Dispenser settings. These are set in the factory and should not be changed.	C-A or C-b	*****
Maximum flow		9A **** or 9b ****
K-Factor	FA or Fb	*****
Configuration code. This is set at the factory and should not be changed.	C	*****
Solenoid delay		SdA *** or Sdb ***
Preset cutoff		PcA *** or Pcb ***
Preset rounding		PrLA*** or PrLb*** PrHA*** or PrHb***
Flow time out		n-A *** or n-b ***

### Changing the 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.

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

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

$$= \text{Existing } K \text{ Factor} * 2$$

See Using the Dispenser Menus to edit these settings. Use the procedure for both side A and B.



## Parameter Settings

The settings that can be accessed from the parameter switch are shown below. Not all of these will need to be changed during installation, therefore information on the following pages refers only to the settings that must be changed. Once the pump has been installed, if further customisation of the unit is desired, refer to the C5000 Master Manual.

Setting	Price Display	Litres Display
Software Version – the pump will then run a segment test	P*****	P*****
Pump Number		PnA *** or Pnb ***
Price		PA***** or Pb*****
Pump Settings		bA **** or bb ****
High-flow cut off		LFA ***
Low-flow cut off		HFA ***
b Setting. This is not currently in use and should not be changed		b ****
Electronic Totes	LA **** or dA **** Lb **** or dA ****	L ***** d *****

### Changing the Pump Number

If the parameter switch is continually depressed, the following menu to change the pump number will appear. Each side must be numbered between 1-99. Entering a pump number 0 will disable the pump.

To change the pump number, depress the parameter switch repeatedly until the following display is shown. To increment a digit, press and hold the parameter switch when the desired digit is flashing. Repeat this procedure for side B if applicable.



### Changing the Price

The price must be set before the dispenser can be used, otherwise an error will be returned. Set the price in dollars per litre.

To change the price, depress the parameter switch repeatedly until the following display is shown. To increment a digit, press and hold the parameter switch when the desired digit is flashing. Repeat this procedure for side B if applicable.



### Standalone Mode

In standalone operation, the dispenser will continue working when not connected to a controller. When in Stand-alone mode no authorisation of fills is required and so fills are simply initiated by removing the refuelling assembly from its holder. If standalone operation is inhibited, the dispenser will not work in 'stand-alone' mode, regardless of whether the dispenser is ONLINE to a controller or not.

The dispenser ceases to work in 'stand-alone' mode if connected to a controller, regardless of the position of standalone setting.

Generally, on retail forecourts the dispenser should be set-up for standalone operation. Hence, if the forecourt controller breaks down the dispensers can be set to work in 'stand-alone' mode simply by turning them off then on again.

For unattended refuelling sites, the dispensers should not be able to work in 'standalone' mode in the event of a controller failure. Therefore, the dispenser should be set-up to inhibit standalone operation.

This is set in the b code on the K factor switch. The b code to run Standalone without Dispenser Controller is 1000. The b code to inhibit Standalone is 0000.





## Notes

### Pump Controller

If the pump is connected to a controller, check that pump data and transaction information is being correctly uploaded to it. Refer to the controller manual for specific instructions regarding connection and setup.

### Spare Fuses

In the event of a fuse blowing on the C5000 Power supply a bag of 3 is included in each flameproof box. Any fuses used from this bag should be replaced.

**NOTE:** *There are three different ratings used. If replacing a fuse, ensure that the correct value is used.*

### Precautions if Using Generator Power

The power output from onsite generators can cause power spikes that may damage electrical components within the cabinet. When connecting to sites powered by generators, please take the following precautions:

1. Install a power conditioner. Although generators are fitted with power regulators, most are not filtered sufficiently for powering sensitive electrical components. We recommend installing a commercial power conditioner and/or UPS between the generator and the unit.
2. Before starting a generator, make sure the power to the unit is turned off. Start the generator, let the generator reach stable operating speed and wait 30 seconds before reconnecting the power to the unit.
3. For units where the generator starts and stops on demand, install a delay timer or PLC to automatically isolate the unit until the operating speed and consistent power output is achieved.
4. Isolate the unit before shutting down the generator.

## Error Messages

Error Code	Fault	Action/Information
Er FL0	Excess flow	Maximum flow rate exceeded
Er 3	No price	Set the price
Er 8	Reverse flow.	Check product is not flowing back into the tank once the delivery has finished. This only occurs if the non-return valves installed on site are faulty
Er 10	Configuration lost	Reconfigure the unit
Abd	Display error	Check connections to display
hold	Processor offline / no power to processor	This will occur upon start up – allow time for the processor to load. If the problem persists, check connections to processor
cAL ib c	K-Factor data integrity failure, or the processor board has been replaced	The K-Factor seal must be broken, and the switch must be pressed
cAL ib P	The K-Factor board has been swapped/replaced	The K-Factor seal must be broken, and the switch must be pressed
orun	Overrun – flow above preset	Increase the preset cutoff
SuNP	Sump error – liquid detected in the sump	Empty the sump. Check the dispenser for leaks