ADBLUE DISPENSER SERVICE MANUAL

AdBlue Dispenser Service Manual

Version 1.0.9

Date: 17th June 2020

Model: LASER: LLA30 I MASTER: MA30, MMA30, MMA30-80, MMA30-160

compac
PREMIUM DISPENSER TECHNOLOGY

Conditions of Use

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- Compac Industries Limited accepts no liability for personal injury or property damage resulting from working on or adjusting the equipment 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.
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SYSTEM CERTIFICATION
ISO 9001
SGS

Product Identification

Specifications	
Manual Title	Compac AdBlue V50 Dispenser Service Manual
Original Publication Date	09 June 2016
Models Covered	This manual applies to Compac AdBlue Dispensers of the following models manufactured from 2015 onwards. LASER: LLA30 **I** MASTER: MA30, MMA30, MMA30-80, MMA30-160 ***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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Safety

PRECAUTIONS

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

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

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

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.

Site Safety

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

Static Electricity Precautions

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

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

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

Installation

Refer to the AdBlue V50 Installation and Setup Instructions supplied with the dispenser and also available as a download from www.compac.biz.

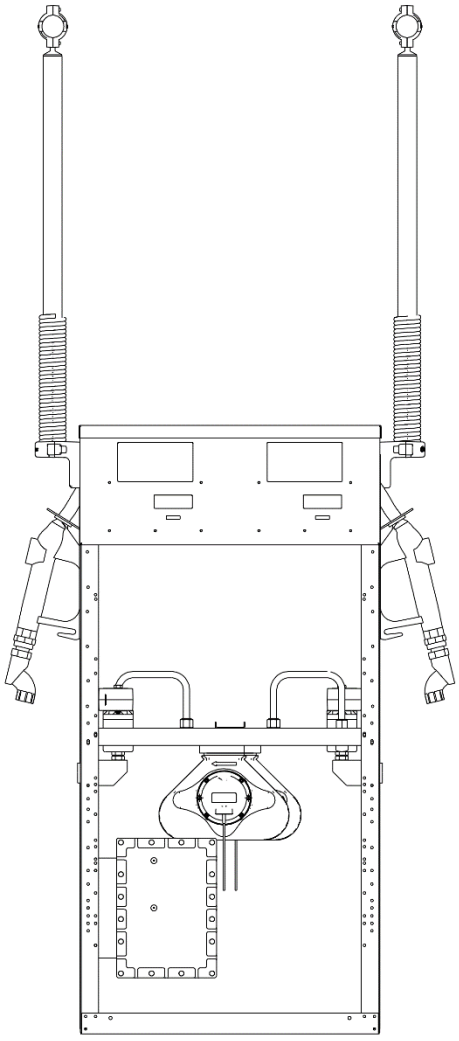
Do not commence installation without the specific installation instructions for your unit. Some information is duplicated here to help with reconfiguration and calibration after part replacement or software upgrading.

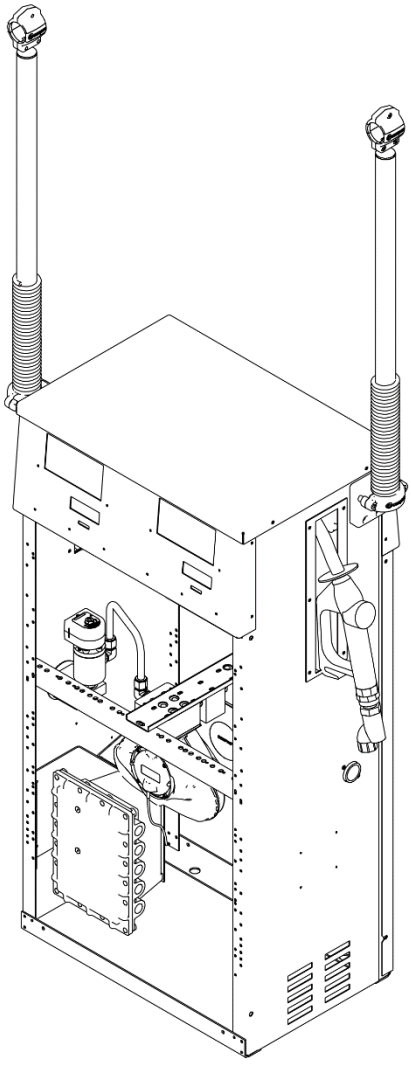
Introduction to the Compac AdBlue Dispenser

The Compac AdBlue dispenser is designed for safe, easy and accurate dispensing of urea solution AUS32 - AdBlue. It is fitted with the revolutionary V50 Coriolis meter which gives improved flow, has no wearing parts and requires minimal servicing. It is controlled by the Compac C4000 processor which monitors all operating parameters to ensure correct metering and pricing.

AdBlue/Diesel

Commonly, Compac packages a single hose diesel and single hose AdBlue dispenser in a single frame for ease of use. In this case, AdBlue is always Side A and diesel Side B. The two act independently, but share a single C4000 processor and power supply. Settings for both AdBlue and diesel are compiled in the K-Factor switch and Parameter Switch menus. This manual is for the AdBlue dispenser. Refer to the Liquid Fuel Dispenser and Pump Service Manual, which can be found on our website - www.compac.biz - for information on the diesel dispenser on Side B.





Operating Parameters

The Compac AdBlue dispenser is designed to dispense urea solution AUS32 under the following conditions:

- Minimum measured quantity 2 L
- Maximum flow rate 30 L/min
- Minimum flow rate 3 L/min
- Maximum pressure of the liquid 320 kPa
- Minimum pressure of the liquid 50 kPa
- Dynamic viscosity (at 25°C) 1.4 mPa.s
- Maximum temperature of the liquid 30°C
- Minimum temperature of the liquid 0°C
- Ambient temperature range -25 to 55°C

Approvals

Copies of Compac AdBlue Weights and Measures and Electrical Approvals are available from our web site at www.compac.biz. They can be viewed, downloaded and printed as .pdf files from our website.

Principals of Operation

AUS32 AdBlue is pumped from an external tank either by a submersible pump or external pump.

The AdBlue passes through the dispenser's V50 Coriolis meter, and the volume through the meter is measured. The metered volume and price are then displayed.

Finally, the AdBlue passes out of the dispenser via its nozzle.

Software Logic

When a site controller controls the dispenser and the nozzle is removed from the dispenser the dispenser waits until it is authorised before commencing the following sequence to allow filling. If authorisation is not received from the controller the solenoids remain closed and the pump will not start. (If there is no site controller, the dispenser will commence the following sequence to allow filling when the nozzle is removed from the dispenser.)

The C4000 sends an output to the AdBlue motor control to start the AdBlue pump and the display starts to go through the 88888's sequence.

During the 88888's sequence the V50 meter measures the density of the AdBlue. Once the density has been successfully measured, the display resets to 0.00, the solenoid opens, and filling can commence.

At the end of the fill the C4000 motor output turns off and the solenoid closes.

Under normal conditions, to end a transaction on a C4000 controlled pump/dispenser, there are three possibilities:

- Flow rate drops below 4 litres per minute for ten seconds.
- Returning the nozzle to its holder.
- The site controller terminates the fill.

Whichever event happens first will terminate the sale.

Dispenser Totals

As well as having electromechanical totes for storing the total number of litres dispensed from each hose, the C4000 stores these totals in its memory. These totals cannot be reset.

Remove the nozzle from the nozzle holder. Hold the nozzle switch down for at least three seconds and then tap it in five times in quick succession.

The totals will then appear on the pump displays, on the LITRES and DOLLARS display, for ten seconds before the display resets.

NOTE: *The electronic total for litres and dollars is displayed as xxxxxxxx.xx. Therefore the display will roll over and start again at zero once the total reaches 99999999.99.*

Electronics

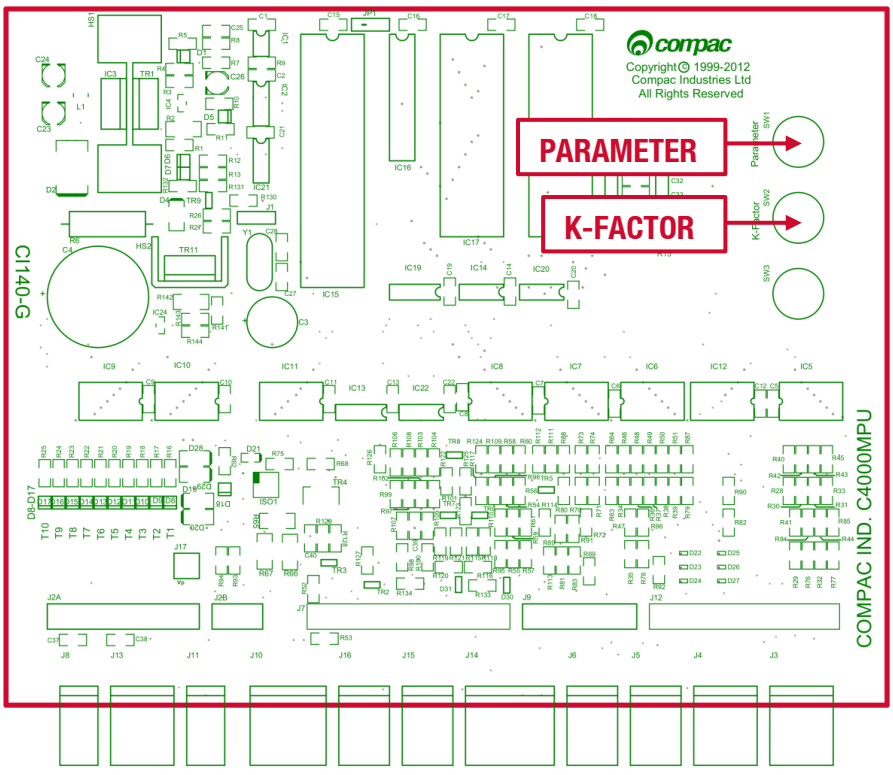
C4000 Processor

The Compac C4000 is a microprocessor-based circuit board designed for use in liquid and gaseous fuel metering. One C4000 head is used for a single or dual AdBlue or AdBlue/Diesel dispenser. The C4000 accepts inputs from the V50 meter. It converts the V50 meter output to litres and displays litres with the price and total of the sale on the retail LCD display.

NOTE: *wait at least 30 seconds from powering up the C4000 before starting a fill. Failure to do this will result in a "density" error.*

The parameter and K-Factor switches are used to configure the dispenser's C4000 processor. Changes made can affect how the dispenser operates and can result in it becoming inoperable. Only make changes when you understand what you are changing.

The parameter and K-Factor switches are located on the C4000 board, which is in the dispenser cabinet and covered by a metal panel. The K-Factor switch is sealed to prevent tampering.



K-Factor Settings

To access the K-Factor settings, unseal the K-Factor switch and press repeatedly, this will open the settings in the table below. Continuing to press the K-Factor switch will scroll through each digit of each of the settings until the Configuration Code setting is reached.

To go back to a previous setting, you must wait 10 seconds for the menu to timeout, and start again.

Setting	Price Display	Litres Display
Display Resolution	Sr	Sr 0/0.00/ 0.000
Solenoid Delay	Sd	dHHH
Preset Cut-Off	Pcut	PcHHH
K Factor	F/Fb/F 1/ F2/F3	HHHHH
Meter A ID	id-A	HHHHHH
Meter B ID	id-b	HHHHHH
Configuration Code	c	HHHHH

To change the value of a selected digit, hold down the K-Factor switch. This will cause the digit to cycle through (0,9). Releasing the K-Factor switch will select the digit.

The K-Factor switch must be resealed after use to prevent unauthorised access.

NOTE: *before altering any K-Factor switch settings, ensure the nozzles are hung up, and the dispenser is idle.*

Display Resolution

The Display Resolution setting sets the maximum amount of AdBlue per transaction. This prevents the transaction cycling back to zero when the display resolution is exceeded by the dispensed volume.

Solenoid Delay

The Solenoid Delay is installed in the program to enable a delay between the remote pump starting and the dispenser solenoids opening.

This setting should never be set more than 4-6 seconds and the default setting is 5 seconds.

Its main purpose is to allow the leak detector on the submersible pump to carry out its leak test.

K Factor

Adjusts the calibration factor of the meter. This allows the meter to correctly measure the mass of AdBlue flowing through it. This is then converted to volume of AdBlue, in litres, using temperature and density.

To set the K-Factor:

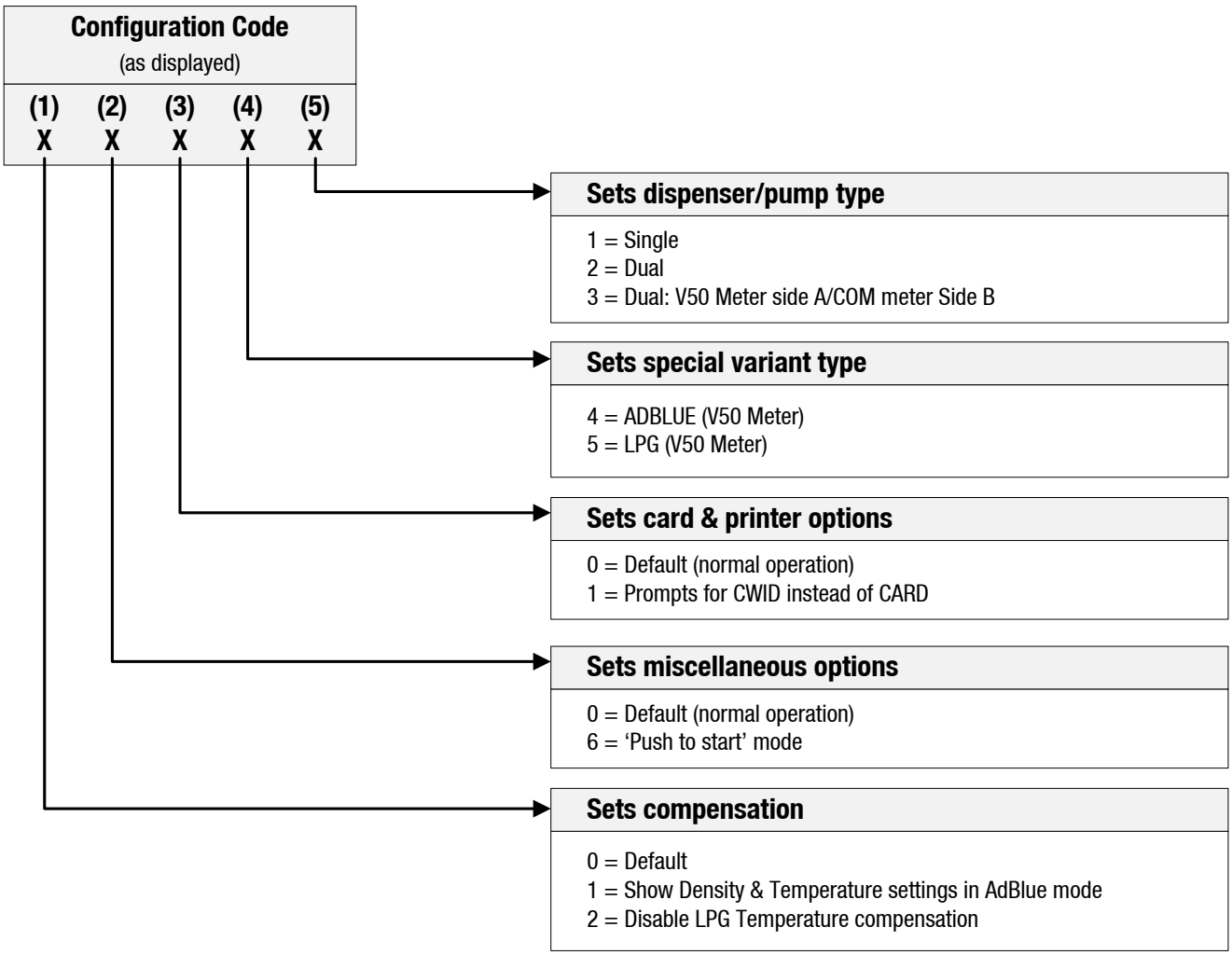
- Press the K factor switch once and release. The display will show FHHHHH if the dispenser is a single and FAHHHHH if the dispenser is a dual. HHHHH is the default factory K-Factor setting for AdBlue.
- Repeatedly press the K-Factor switch until you reach the digit you want to change and hold the K-Factor switch in to scroll. When the correct digit is reached release the switch.
- Press and hold the switch again and the next digit will scroll. When the correct number is reached release the switch.
- Continue this procedure until the correct K-Factor is entered.

Meter ID

Pairs the meter to the ModBus C4000 board. This will have to be changed whenever the V50 meter is replaced.

Configuration Code

Changes the software for the number of hoses and fuel type. If changing a C4000 processor board this must be set first. The diagram below shows possible configurations.



Parameter Settings

When the Parameter switch is pressed once, the system enters a diagnostic mode, whereby it displays the program type data and performs a display segment test. When showing program data, the display panel shows PHH where HH is the program version number.

When the Parameter switch is pressed repeatedly the settings in the table below will be opened. Continuing to press the Parameter switch will scroll through each digit of each of the settings, and loop around to the beginning once the end is reached.

The C4000 will timeout if left idle for 10 secoonds. This will reset the menu.

Setting	Price Display	Litres Display	Unit Price Display
Price	Pr-A	PHHHH	
Pump Number		PnAHH	Last End Sale
Last Fill	Last Litres	Last Density	Last Temperature
b Configuration	b	bHHHH	

To change the value of a selected digit, hold down the Parameter switch. This will cause the digit to cycle through (0, 9). Releasing the Parameter switch will select the digit.

NOTE: *before altering any Parameter switch settings, ensure the nozzles are hung up, and the dispenser is idle.*

Price

Sets the price/litre of AdBlue that the dispenser displays. This is almost always done remotely through a site controller but can be done manually at the dispenser by setting PHHHH to the desired price/litre.

NOTE: *the AdBlue dispenser will not allow the price/litre to be altered during a delivery. When the price/litre is altered, the AdBlue dispenser will display the new price/litre for at least 5 seconds before allowing a new transaction to begin.*

Pump Number

This must be set at the dispenser for each hose, so that communications with a controller can take place. To set the pump number:

- Press the Parameter switch repeatedly until PnAHH appears in the litres display window.
- Press and hold the Parameter switch to increment the pump number. The switch should be released when the desired dispenser number is displayed. The value of the displayed number will then be stored in the C4000 memory as the dispenser number for that hose.
- When the switch is pressed again PnbHH will appear on the display.

These two options will toggle each time the switch is pressed.

The end of sale indicator is displayed in the unit/price display.

NOTE: *For a single hose only* PnHH *will be displayed.*

Last Fill

Displays the uncompensated values of the last delivery.

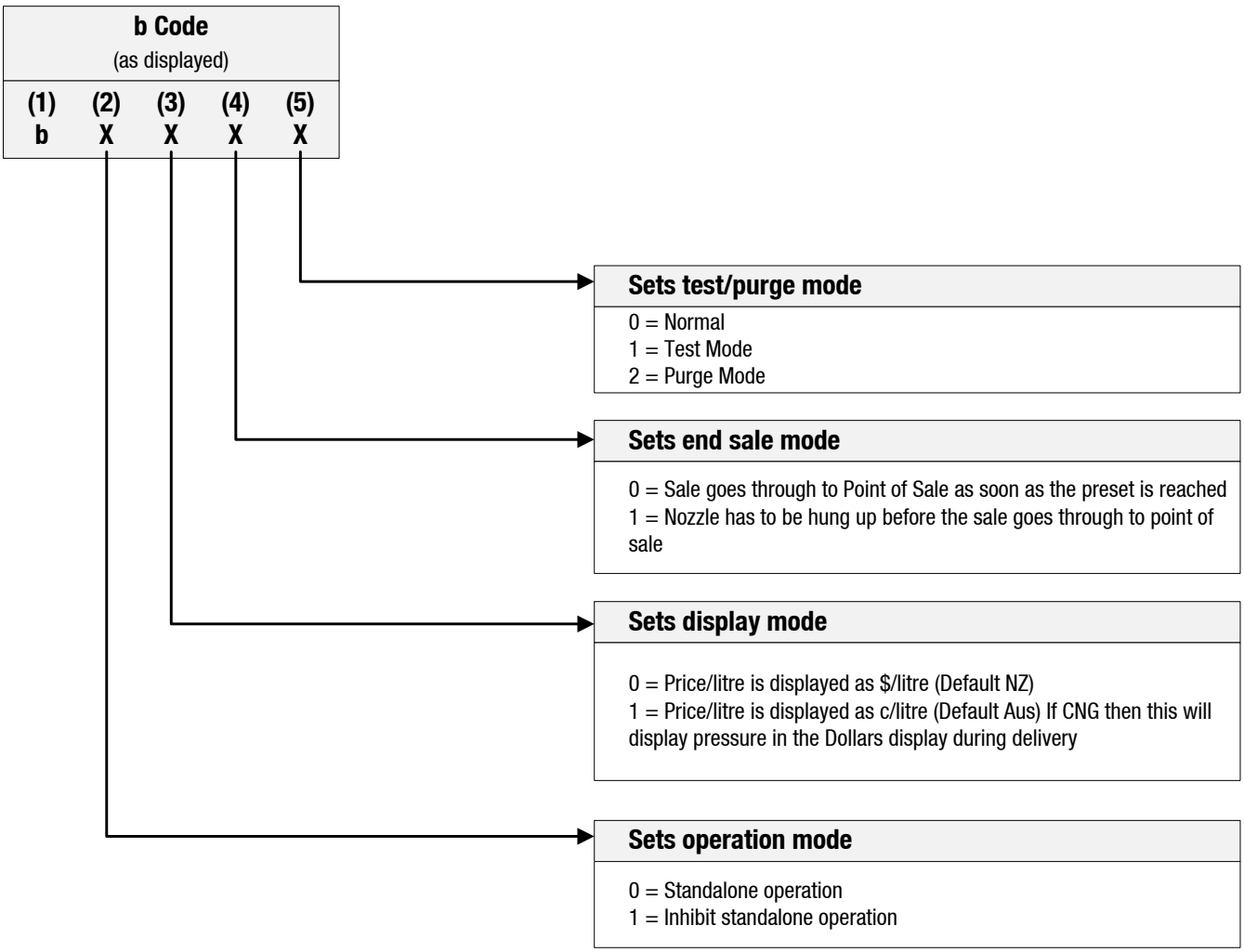
The uncompensated volume is the actual metered volume and is displayed in the litres display.

The displayed temperature is the last temperature reading during the delivery. It is displayed on the unit price display in degrees Celsius.

b Configuration

The b Configuration code controls several programmed options for the dispenser.

NOTE: *the correct b Code for the unit is printed on a yellow label on the C4000 board cover.*



Purge Mode

For purge mode, set the last digit of the b configuration code to 2 (XXX2). Lifting the nozzle will open the solenoids and allow the unit to dispense unmetered AdBlue. This allows the lines to be purged of air without the meter registering an error and closing the solenoids. The display will read “Purge On”.

Test Mode

For test mode, set the last digit of the b configuration code to 1 (XXX1), this will display density in the unit price display to allow the user to see what the meter is reading. Otherwise the dispenser operates normally.

Operation Mode

In standalone operation, the dispenser will continue working when not connected to a site controller. 'Stand-alone' mode requires no authorisation and a fill is initiated by removing the nozzle from its holder. If standalone operation is inhibited, the dispenser must receive authorisation from a controller in order to work.

Generally, on retail sites the dispenser should be set-up for standalone operation. If the site controller breaks down, the dispensers can be set to work in 'stand-alone' mode simply by turning them off then on again. In 'stand-alone' operation, if the controller comes online, it will automatically resume controlling the dispenser.

For unattended refueling sites, the dispensers should be set up to inhibit standalone operation in the event of a controller failure. The 'b' code to inhibit 'stand-alone' is 1HHH.

End Sale Mode

Sets the action that ends the transaction. The dispenser can end a transaction when the preset is reached, or when the nozzle is hung up.

Display Mode

Sets whether the dispenser display the price/litre as cents/litre or dollars/litre. This option is specific to countries which use dollars, where the convention is to display the price in cents.

Diagnostics

Indicator LEDs

Power LED

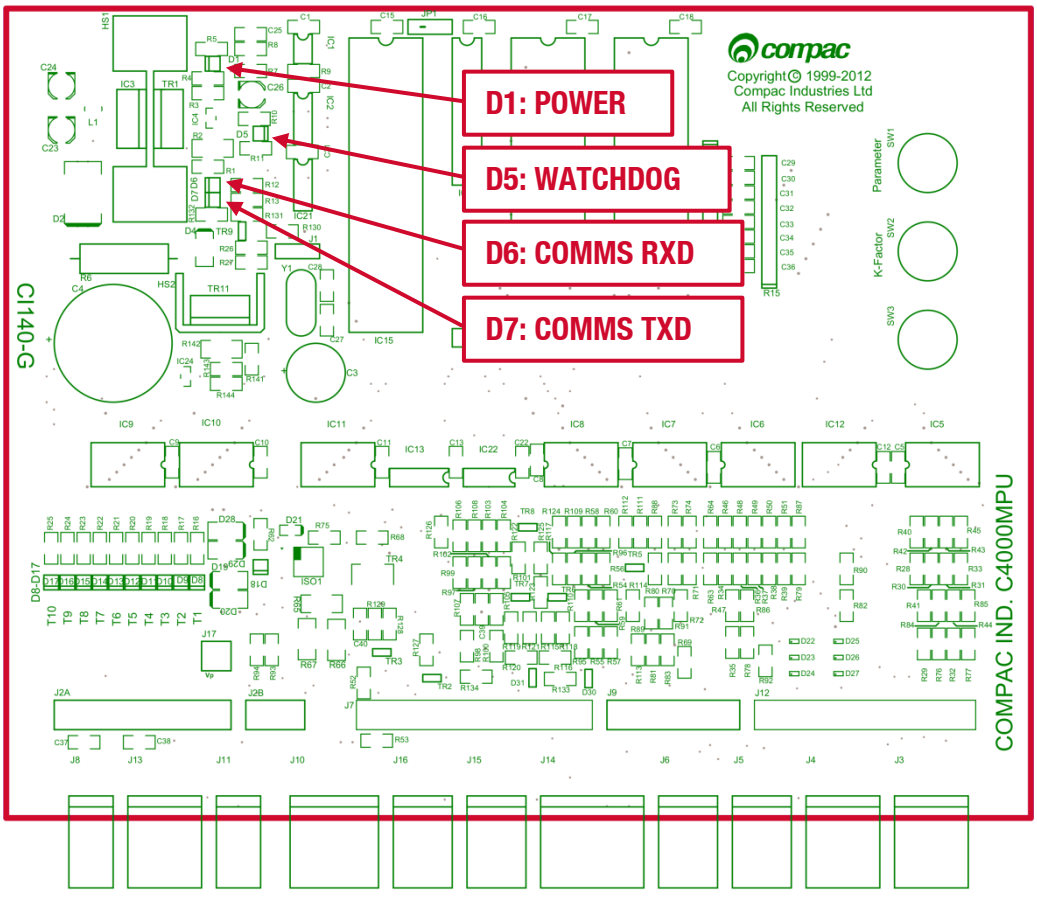
The Power LED lights when the processor board has power. If this LED flashes, this indicates that the processor has a fault on the processor power supply.

Watchdog LED

The Watchdog LED lights only if the watchdog circuit has been triggered, thereby indicating that a processor fault has occurred.

TXD & RXD LEDs

The TXD and RXD LEDs indicate polling of communications to/from a controller. The RXD LED flashes whenever any communications polling is received and the TXD LED flashes whenever the C4000 processor responds to polls for its respective pump number(s).



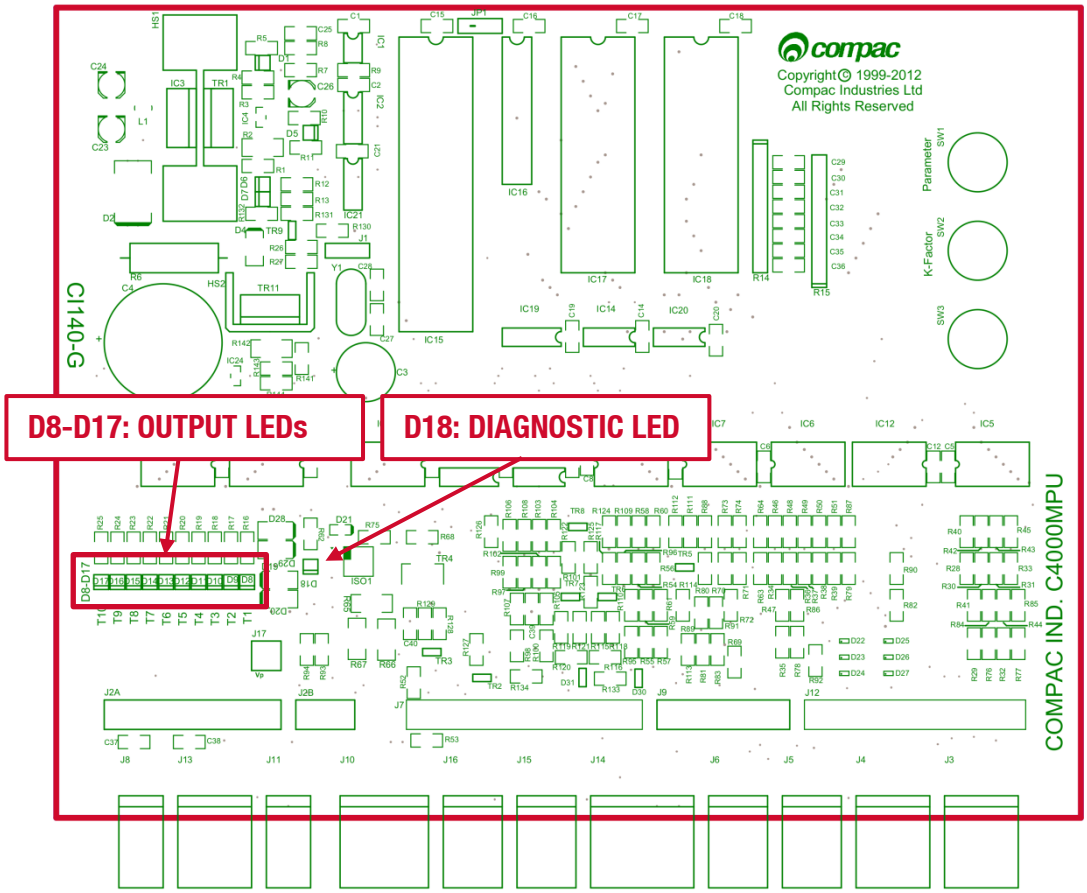
Output LEDs

The ten Output LEDs indicate which triac outputs are being switched on. D8-D17 corresponds to the output triacs T1-T10.

Diagnostic LED

The Diagnostic LED flashes in three different states when the processor is working properly:

- When the pump is idle and in 'stand-alone' mode, the LED flashes slowly and consistently.
- When the pump is idle and communicating with a controller the LED flashes slowly but erratically.
- When the nozzle is lifted from its holster, the LED flashes quickly.



Hydraulic System

Component	Function
Manifold	Allows flow of AdBlue into and out of the Meter.
V50 Meter	Meters the flow of AdBlue. Also measures AdBlue density and temperature and detects vapour.
Solenoid	Provides on/off flow control over the AdBlue through the dispenser.

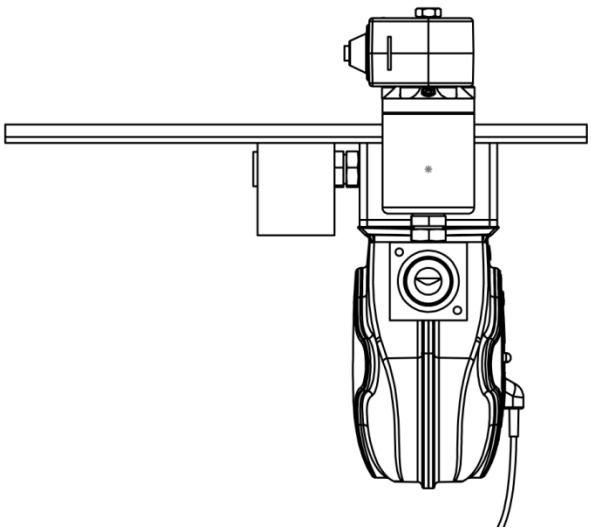
Typical Cycle

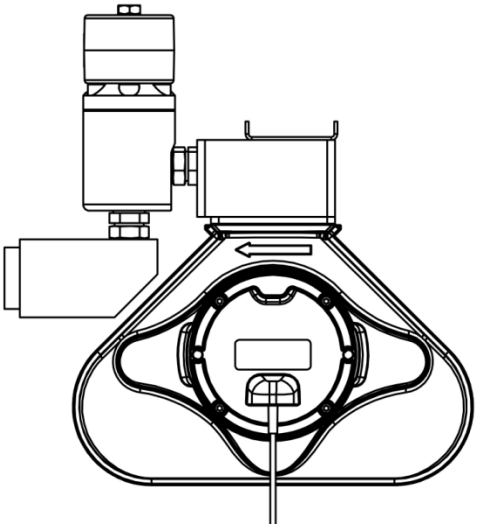
The following describes a typical hydraulic cycle.

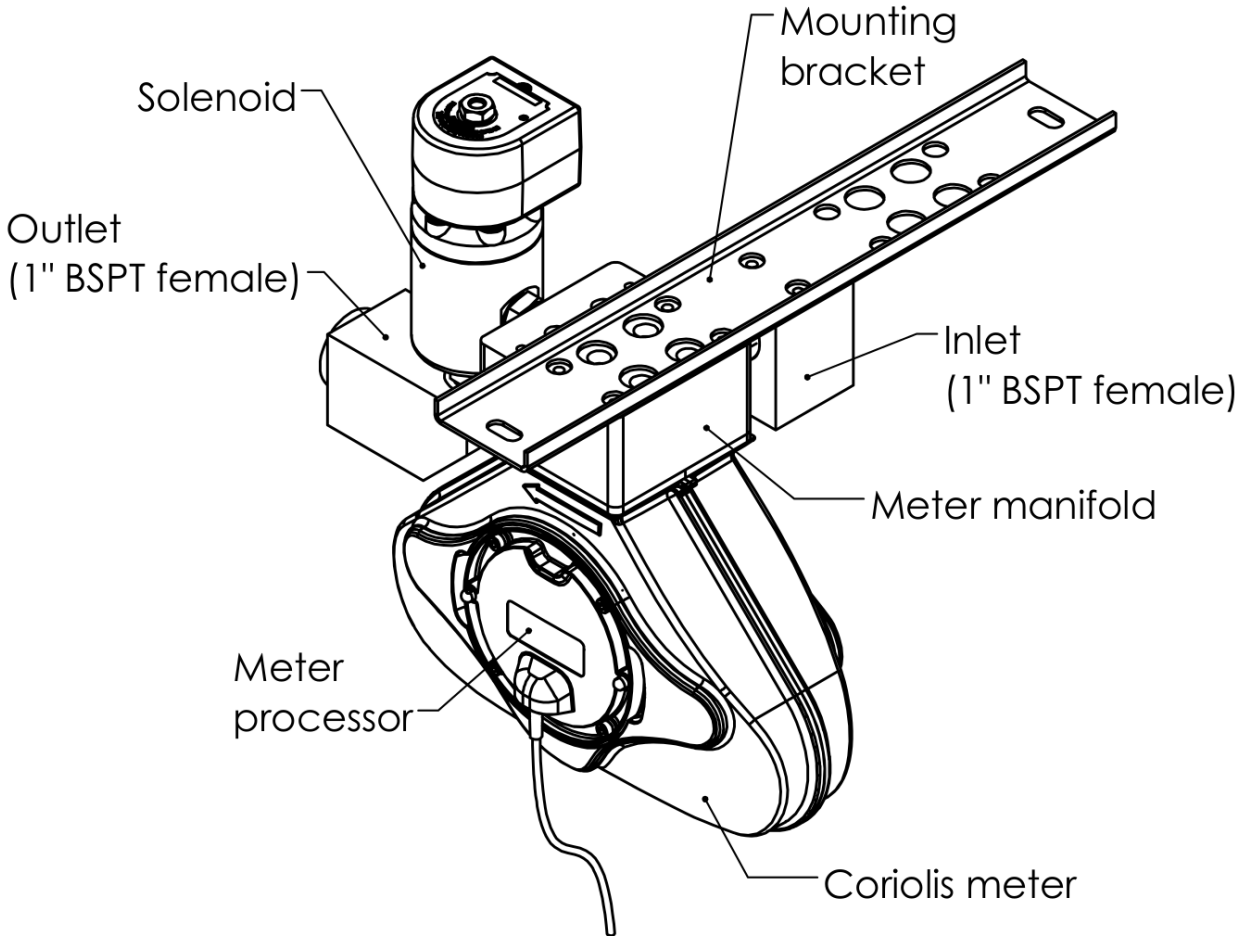
Operator Action	What Happens at the Dispenser
Lift the nozzle	If there is no site controller, the C4000 activates the AdBlue pump and the display shows 88888 as the V50 meter checks the density of the AdBlue. If the density checks out, the display resets, the solenoid opens and the fill commences. If there is a site controller the AdBlue dispenser must be off hold before the nozzle is lifted. The nozzle must be hung up for 3 seconds before lifting and placing in the vehicle.
Nozzle lever opened.	AdBlue flows through the dispenser and is metered.
Nozzle lever closed and nozzle is hung up.	The solenoid closes and pump stops after the fill has ended.

Hydraulic Layout

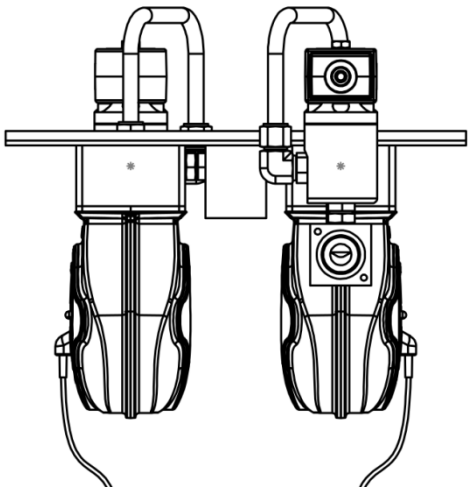
Single V50

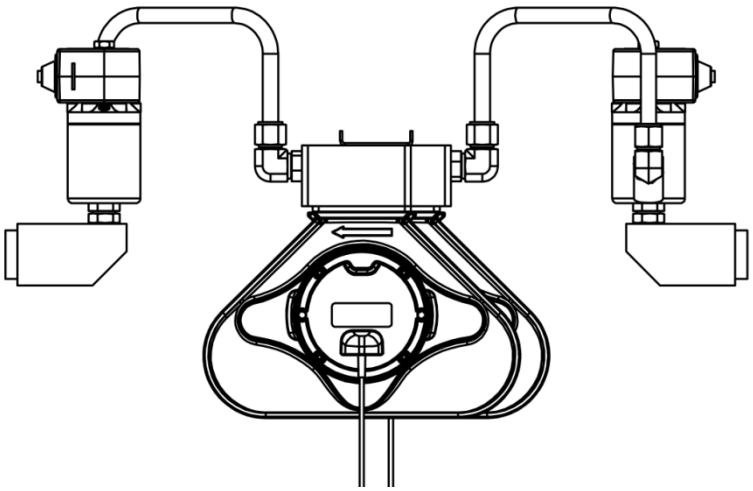


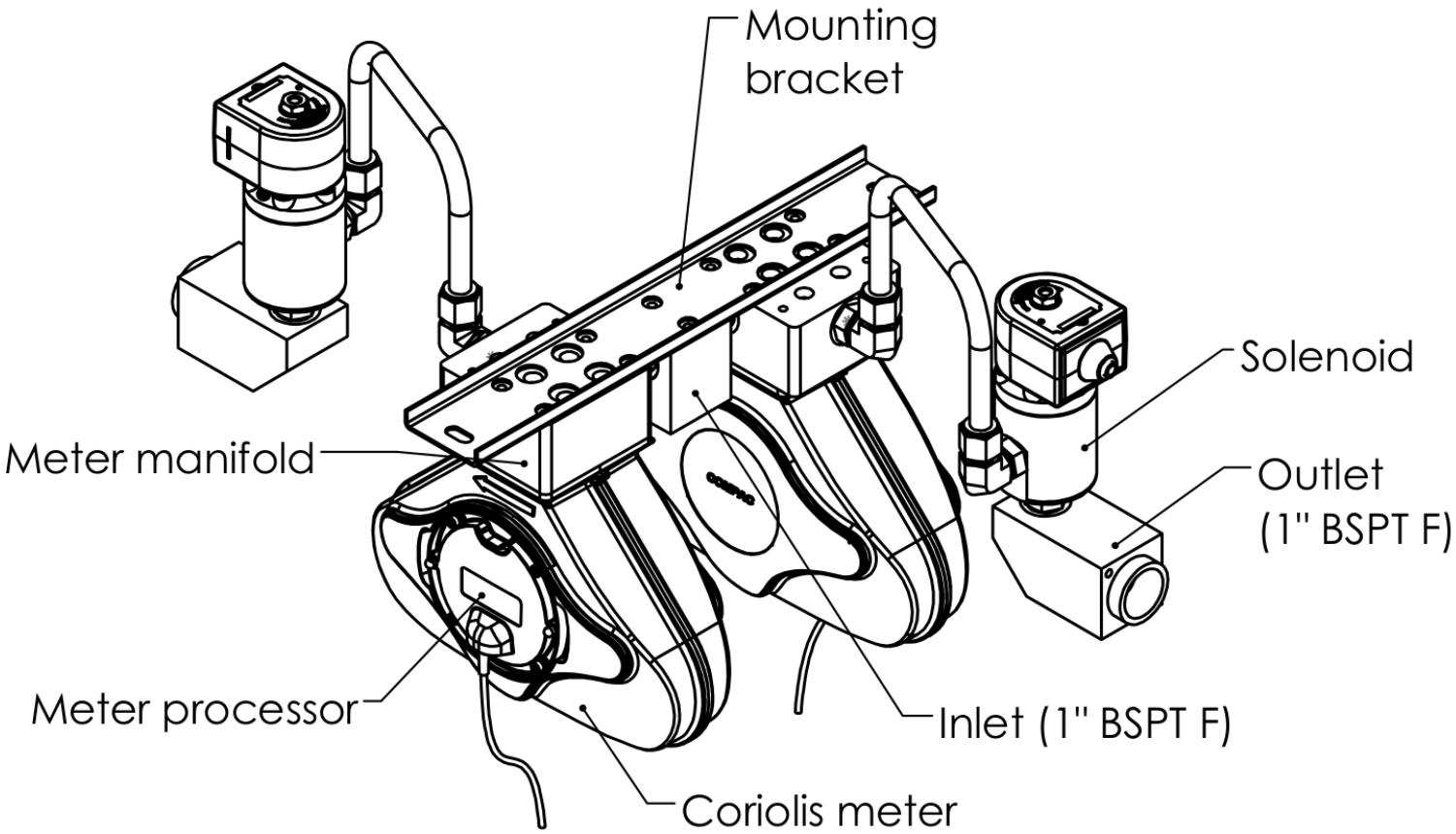




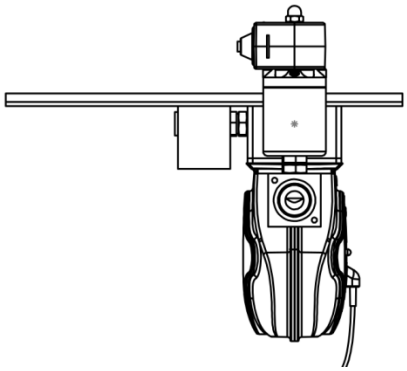
Dual V50

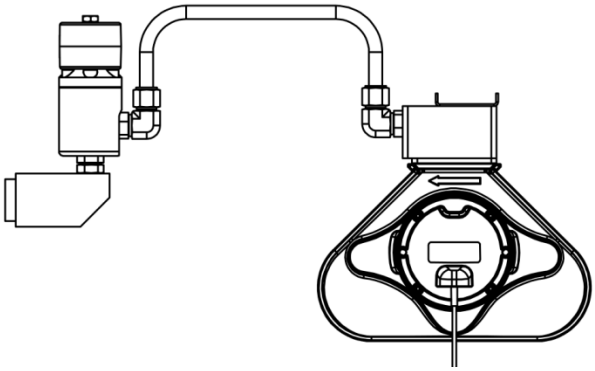


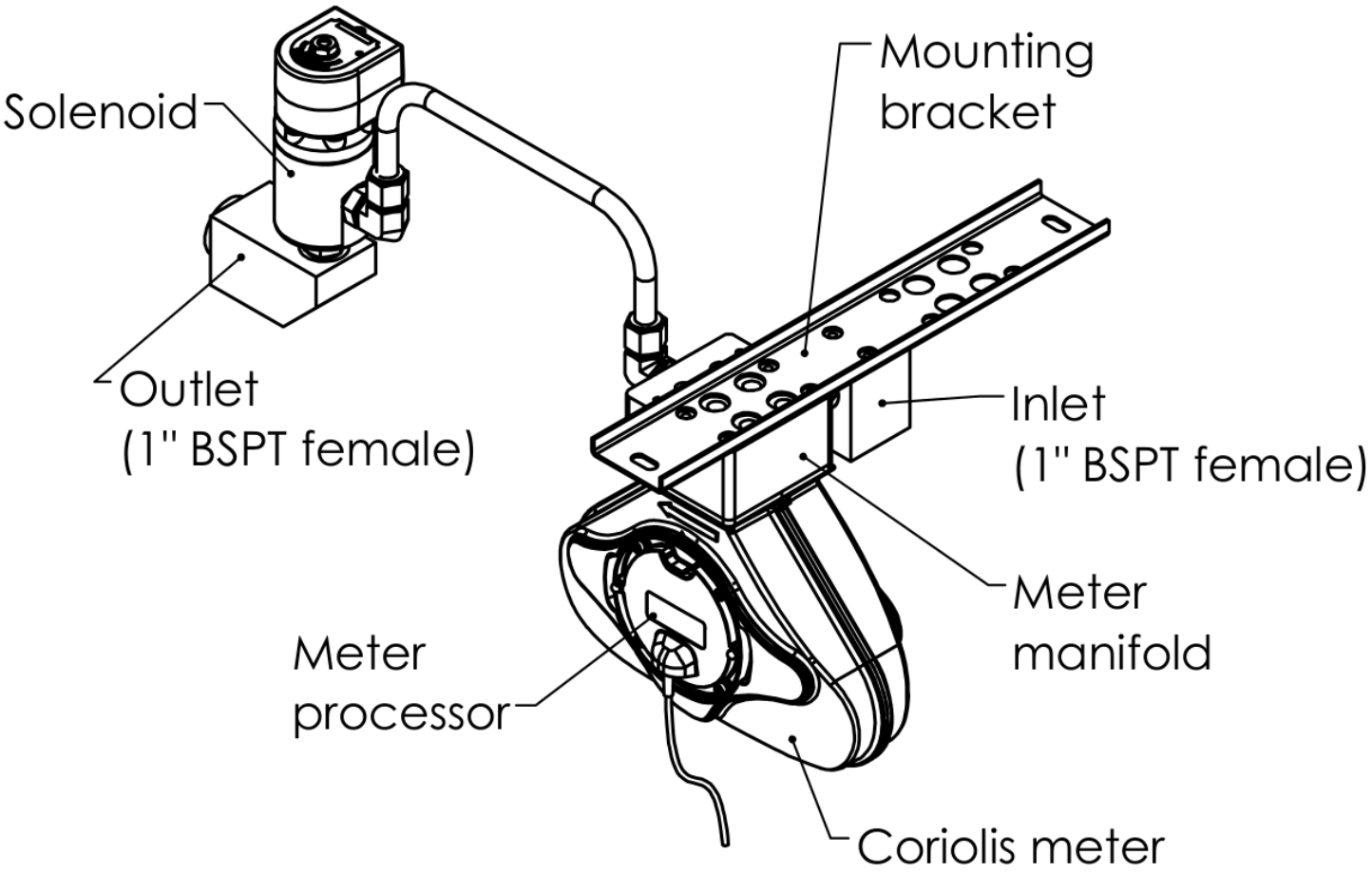



Mounting bracket
Solenoid
Meter manifold
Outlet (1" BSPT F)
Meter processor
Inlet (1" BSPT F)
Coriolis meter

AdBlue/Diesel (Only AdBlue Side Shown)







Electrical System

Triacs

The triacs or solid state relays are 240V output switches controlled by the C4000. These are wired to the pump contactors and solenoids as shown below.

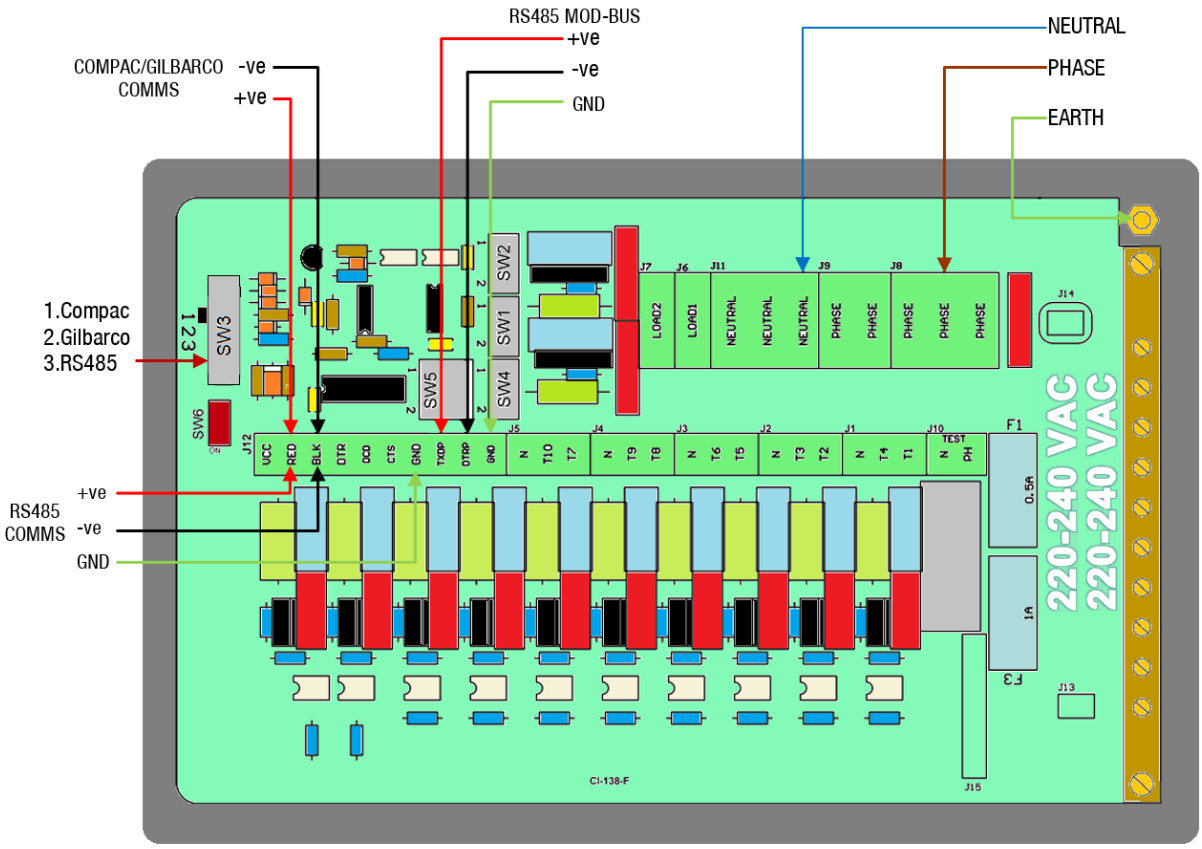
There may be occasions when the solenoid coil may not be able to be installed in its normal orientation. If the coil is reversed on the solenoid, the connections on the C4000 must be reversed also.

Communications Protocol

The communications protocol of the primary COMMS output of the C4000 power supply is controlled by switch 3 (SW3) on the C4000 power supply. The configurations are as follows:

Position 1 = Compac COMMS Protocol
Position 2 = Gilbarco COMMS Protocol
Position 3 = RS-485 Protocol

NOTE: *Different software is required for each protocol*



Power Terminal	Function	High/Low
	AdBlue Single/Dual:	**Current output:**
T1	Electric Motor Control (SW1 = 2) side 'A'	Low (300 mA max)
T2	Secondary (low flow) Solenoid Control Side 'A'	Low (300 mA max)
T3	Primary (high flow) Solenoid Control Side 'A'	Low (300 mA max)
T4	Electric Motor Control (SW2 = mid) Side 'B', looped to T1	Low (300 mA max)
T5	Secondary (low flow) Solenoid Control Side 'B'	Low (300 mA max)
T6	Primary (high flow) Solenoid Control Side 'B'	Low (300 mA max)
T7	Spare	Low (300 mA max)
T8	Spare	Low (300 mA max)
T9	Spare	Low (300 mA max)
T10	Excess flow output - Turned on if flow rate exceeds 100litres/min. Stays on until dispenser turned off.	Low (300 mA max)

NOTE: *AdBlue solenoids do not have a low flow mode. This means that the coils are only connected to the primary (high flow) terminals.*

Intrinsically Safe Wiring

Nozzle Switches

The nozzle switch leads plug in between '*NSWx'* and *'GND'.* When the nozzle is lifted, the nozzles switch closes and the C4000 initiates a transaction.

NOTE: *Diagnostic LED will flash rapidly when any nozzle is lifted regardless of hose configuration.*

Display Backlighting

The backlighting units for the display PCB's are mounted behind the LCDs and should not be removed.

The backlighting is supplied from the C4000 *'Backlight'* plug (J17). This is an intrinsically safe supply.

Servicing

Tools

Servicing the dispenser does not require any specialised tools but to undertake comprehensive servicing, repairs and calibration the following equipment is required. Before attending the site, read the manual and establish the equipment that you will need to take to site.

- A full set of metric and imperial wrenches
- A 9/16” or 14mm Allen key or hex key
- Long nose pliers
- A multimeter
- An earthing strap

Initial Servicing

Contamination of the fuel supply from dirty pipework is the prime cause of meter and solenoid problems. Two weeks and three months after commissioning a new site the strainer should be cleaned.

- Check the system for leaks.
- Check the nozzle for urea crystals
- Make sure the doors are correctly in place and all panels are secure.
- Check the operation.

Annual Servicing

Every twelve months:

- Do a calibration check. Adjust if necessary.
- Check the system for leaks.
- Check the nozzle for urea crystals
- Make sure the doors are correctly in place and all panels are secure.
- Check the condition of the AdBlue Hose. Replace if necessary.
- Check the operation.

Software Upgrade Procedure

Ensure, before working on the pump, that anti-static precautions are taken (i.e. wearing of wristband with earth strap).

Gain access to C4000 Processor Board and record all set-up data by accessing the configuration (K-Factor) switch and the parameter switch, this includes recording the comms dipswitch settings.

The above step is taken to safeguard against software incompatibility causing loss of information.

- Turn off power.
- Remove software EPROM (removable chip labelled C4000 PXX or XX-X-XX:XX.X) using an EPROM extractor.
- Plug in new software EPROM, being careful that the dimple is at the correct end of the socket (i.e. software chip dimple to base dimple). Also that all the legs are correctly located in the socket (i.e. two socket holes are left above the dimple).
- Turn on power.
- Check that the data recorded in Steps 2 and 4 is still present, if not re-enter.
- Check the electronic totals, if not as before then give 'before' and 'after' totals to relevant people on site.
- Ensure that the status of cards/pins/keys, on ‘Comcard’, ‘Compin’, or CWIDKey systems, is as before. If they are different in any way, ensure that the relevant people on site receive 'before' and 'after' printouts of card/pin/key totals.
- Test dispenser operation.

CAUTION

When replacing Integrated Circuit chips, ensure that the notch is facing in the direction of the IC board socket (the notch is the end that we refer to as the "front").

When inserting the IC chip, the rear pin (of the IC chip) must be plugged into the rear pin socket of the IC board socket. Any spare pin sockets should be in front.

Failure to correctly insert the IC chips or adhere to the above guidelines specified herein will result in a loss of memory data.

V50 Meter Servicing

The V50 meter is field serviceable, and its electronic module can be removed and replaced.

Replacing the Electronic Module

The electronic module can be replaced without draining the dispenser.

- Turn the power off the dispenser.
- Remove the side panel to access the meter.
- Undo the retaining screws on the front of the meter.
- Snip the sealing wires and remove the electronic module from the meter.
- Snip any cable ties and noting where it is plugged in, unplug the module from the C4000 board.
- Fit the new electronic module to the meter. Feed the cable up to the C4000 board and plug it into the same socket as the old module (the clips face outwards).
- Cable-tie the new cable in place and fix the module in place with screws and new anti-tamper seals.

Pairing the Electronic Module

The new module needs to be paired to the C4000 board using the K-Factor switch.

- Start the dispenser and copy down the serial number stuck on the face of the new module.
- Using the K-Factor switch scroll through the menu until you reach the Id-A (side A) or Id-b (side B) screen depending on which meter the module belongs to (dual hose models).
- By pressing then holding in the K-Factor switch, scroll through each digit in turn until the number matches the number printed on the new module.
- When you have the correct number continue to scroll through until you leave the Id menu entirely.

NOTE: *On two hose units it is important to do this operation even if you are only replacing one module. Failure to do this is one of the prime causes of setup problems.*

You will now need to calibrate the new module.

Removing the V50 Meter

The entire V50 meter is available as a spare part complete with electronic module.

- Turn off the inlet valve at the base of the dispenser.
- Turn the power off the dispenser.
- Snip any cable ties and noting where it is plugged in; unplug the meter from the C4000 board.
- Undo the four screws holding the meter in place and remove the meter.

Replacing the V50 Meter

- Make sure the O rings are in place and ensure the meter is in the correct orientation by checking the 'IN' and 'OUT' labels on the base of the meter.
- Using the four screws, fasten the new meter in place.
- Feed the meter cable up to the C4000 board and plug it into the same socket. The clips face outwards.
- Cable-tie the lead neatly out of the way if required.
- Make sure all connections are tight and any drain valves closed.
- Pressurise slowly while checking for leaks.
- Restart the dispenser and pair the new meter to the C4000.
- Calculate and enter the temperature and density offsets and then calibrate the meter.

Calibrating the V50 Meter K-Factor

The calibration factor is a proportional factor of calculated litres dispensed compared to actual litres dispensed. A calibration factor must be set for each meter in the dispenser.

Volumetric Method:

- Place an empty test pail near the dispenser.
- Remove the nozzle from the nozzle holder.
- Wait for the displays on the dispenser to go through its 88888's and return to 0.00.
- Using the nozzle, fill your test pail to the 20L mark.
- Hang up the nozzle.
- Record the litres delivered on the dispenser
- If the calibration is out adjust the K Factor using the following formula: New K Factor = Existing K Factor x Volume dispensed/Volume displayed.

Density calibration Procedure

- After replacing the V50 meter, change the b setting to XXXX2 and purge the system.
- Change the b setting back to XXXX0, change the C setting to 1XXXX.
- Check/change the density to 997 for AdBlue.
- Change the C setting back to 0XXXX and re-power the unit.

Solenoid Servicing

Replacing Solenoid Seals

Remove Solenoid Valve Seals

- Drain the dispenser.
- Switch off the power supply to the dispenser.
- Unscrew the solenoid coil retaining nut and move the coil out of the way.
- Remove the six cap screws from the solenoid top.

NOTE: *Do not remove the angled grub screw from the solenoid top. This is epoxied in place during manufacture and should never be removed.*

- Remove the solenoid top and remove the old top O-ring seal and return O-ring.
- Remove the solenoid spring.
- Screw an M6 cap screw into the solenoid piston to withdraw it from the solenoid body.
- Taking care not to damage the piston, hold the flat part of the piston with a spanner to prevent rotation, then unscrew the M6 x 12 mm cap screw from the bottom of the piston. This releases the solenoid seal retainer and valve seal.
- Discard the old valve seal.
- Clean all oil and dirt off the components with a clean cloth and check that the bleed hole is not blocked.
- While the solenoid is apart, inspect the solenoid piston centre seal and piston for wear, scratching or damage. Replace piston if required.

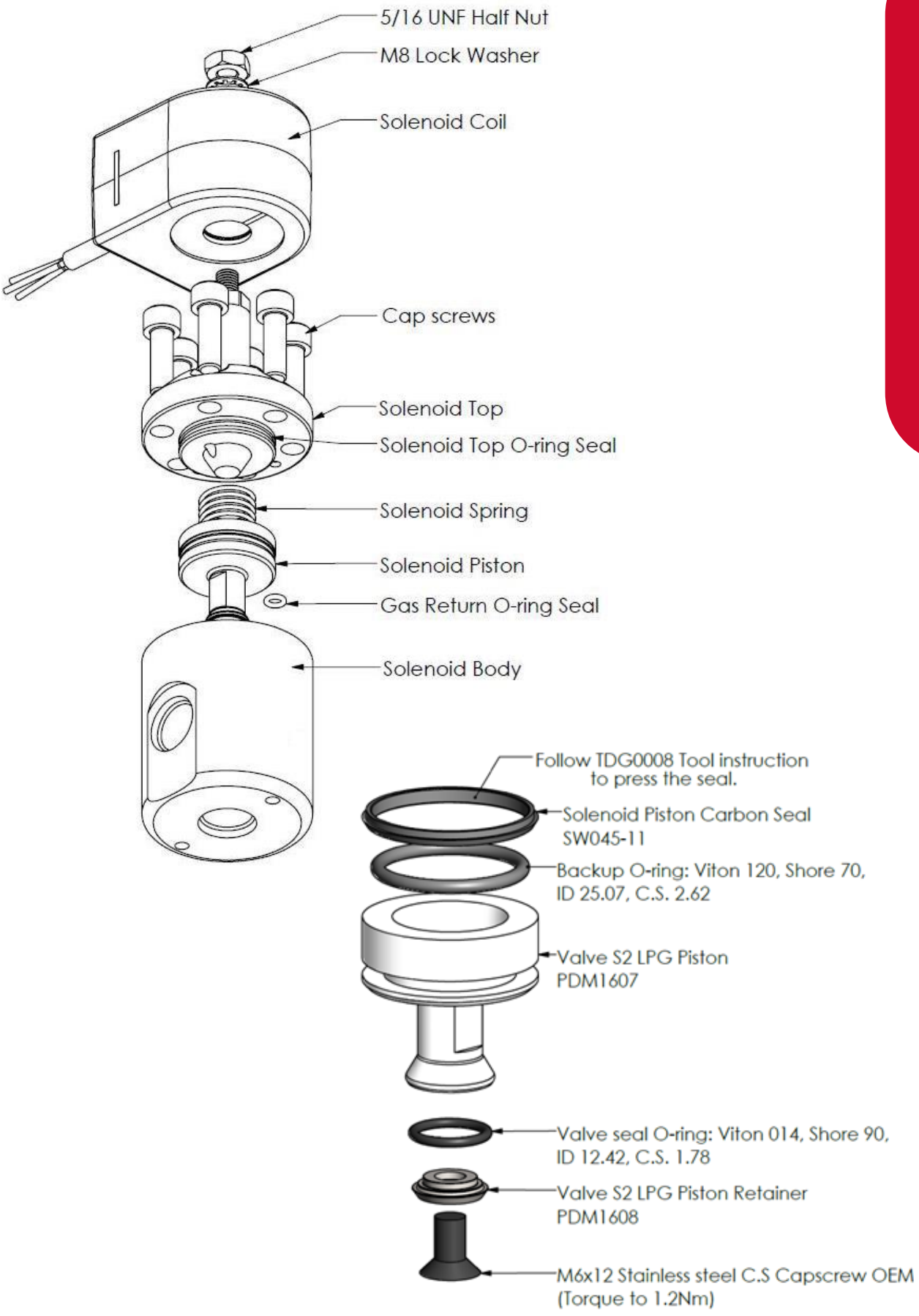
DANGER

Never remove any electrical components without first switching off the power to the dispenser. Failure to turn off the power could result in an electric shock.

Replace Solenoid Valve Seals

- Place the new valve seal and seal retainer on the cap screw.
- Taking care not to damage the piston, hold the flat part of the piston to prevent rotation, and then screw the M6 cap screw into the bottom of the piston.
- Insert a new return O-ring.
- Insert the piston back into the solenoid body.
- Insert the solenoid spring.
- Replace the solenoid top O-ring seal.
- Place the solenoid top back on the solenoid body, making sure that the locating dowel is engaged.
- Screw in and tighten the six cap screws.
- Replace the solenoid coil.
- Re-power the dispenser then check for leaks and correct operation of the valve.

Solenoid Valve Diagram



Replacing the Solenoid Coil

- Drain the dispenser
- Switch off and isolate the power supply to the dispenser.
- Remove the flameproof box lid to gain access to the C4000 power supply board.
- Disconnect the appropriate solenoid coil wiring from the C4000 power supply board.
- Loosen the gland on the flameproof box that is clamping the solenoid coil lead and pull the lead out of the gland.
- Undo the nut on the top of the solenoid valve that is securing the coil and remove the coil from the top of the valve
- Replace with new coil.

DANGER

Never remove any electrical components without first switching off the power to the dispenser. Failure to turn off the power could result in an electric shock.

NOTE: *Solenoid coils are not interchangeable between models. Make sure you order the correct one by quoting the dispenser serial number. To replace obsolete coils, the entire solenoid will need replacing.*

Replacing the Solenoid

- Drain the dispenser.
- Switch off the power supply to the dispenser.
- Undo the nut and remove the solenoid coil.
- Undo the gland nuts connecting the solenoid valve to the pipework and manifold and remove valve
- Ensuring all surfaces are clean and any sealing plugs are removed from the valve, reconnect the pipework to the new solenoid valve and tighten the gland nuts.
- Replace the solenoid coil.
- Repower the unit, check for leaks and test for correct operation.

DANGER

Never remove any electrical components without first switching off the power to the dispenser. Failure to turn off the power could result in an electric shock.

CAUTION

Cleanliness is essential. When working on the open pipes and solenoids, cover the openings with a clean, lint-free cloth to prevent dust and dirt from entering.

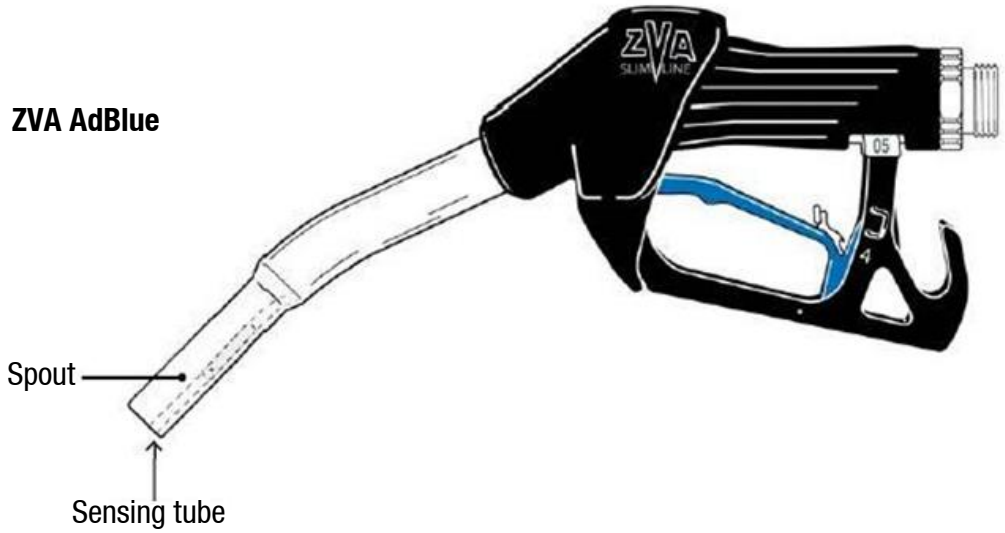
Nozzle Servicing

If AdBlue evaporates it may form white crystals around the dispenser nozzle. A build-up of crystals can block the air passage causing the nozzle to continuously trip off.

If this occurs, rinsing the nozzle in a bucket of warm water will dissolve the crystals and unblock the air passage.

To avoid contamination of the AdBlue, thoroughly dry the nozzle after rinsing, or rinse with AdBlue.

ZVA AdBlue



ELAFIX 40 Magnet adapter
To be ordered separately

To avoid misfuelling, the standard type of ZVA AdBlue is equipped with a magnet opening in the spout. The nozzle will only open with the magnet adapter ELAFIX 40 which must be installed in the vehicle filler neck. For refuelling of other containers, push an ELAFIX 40 over the spout.

Trouble Shooting

Electrical

No Power

- Check power to dispenser/pump unit.
- Check Power LED.
- Check connections.
- If Power LED is off, check for a short on intrinsic devices by unplugging each device until the Power LED lights up.
- Check fuse F1.
- Replace C4000 if fault not found.

Pump Cuts Out

- Check end of sale indicator in the pump number setting on the parameter switch to determine what ended the fill.
- Check Watchdog LED to see if there is a software issue.
- If Watchdog LED is on, check that memory chips are firmly in their sockets.
- Replace C4000 if watchdog is on after repowering unit.

Pump Not Starting

- Check Triac fuse F2
- Check all pump motor connections.
- Check pump motor.
- Check wiring.
- Select a spare High Current Solid State Relay if the above checks are okay.
- If Output LED is off, check nozzle switch, the nozzle switch is working if the Diagnostic LED flashes faster when switch is on.
- Check Display connection.
- Replace C4000 if fault not found.

Pump Not Stopping

- Check nozzle switches are releasing, the nozzle switches are working if the Diagnostic LED flashes faster when switch is on.
- If Output LED is off, select a spare High Current Solid State Relay.
- Replace C4000 PCB if fault not found.

Solenoid Not Energising

- Check Triac Fuse F2
- Check all Solenoid connections
- Check Solenoid
- If Output LED is off, check nozzle switch operation, the nozzle switches are working if the Diagnostic LED flashes faster when switch is on.
- Select a spare Low Current Solid State Relay if the above checks are okay.
- Replace C4000 if fault not found.

Solenoid Not De-energising

- If Output LED is on, check nozzle switch is releasing, the nozzle switch is working if the Diagnostic LED flashes faster when switch is on.
- Select spare Low Current Solid State Relay.
- Replace C4000 if fault not found.

Mechanical

No Flow

- External pump not starting.
- Solenoid valve not opening.
- Nozzle magnet preventing the nozzle from opening.

Low Flow

Typically, the flow rate through the dispenser should be 20 - 30 lpm.

- 'K' Factor set incorrectly showing false flow rate.
- Solenoid Valve not opening fully.
- Insufficient pump pressure.
- AdBlue crystals on Nozzle.
- Nozzle faulty. Replace and repair the nozzle.

Calibration Problems

- Check that configuration is correct for calibration method - i.e., temperature compensation on or off.
- Check that minimum flowrate is above 15 lpm.

Solenoid Valve Not Opening

- Check the Solid State Relay LED on the processor board.
- Check the electrical supply to the coil. Check the C4000 output triac is switched on. There should be 220 – 240 volts across the solenoid coil.
- Put power on the solenoid and hold a screwdriver above the coil to feel the magnetic field pull. Because of the construction of the coil a resistance reading cannot be obtained.

Make sure the pressure on the inlet to the solenoid does not exceed 2,400kPa [350psi].

Solenoid Valve is Sluggish or Inoperative

If the voltage and pressure check out.

- Disassemble and clean out all extraneous matter ensuring all passages are clear.
- The plunger must be free to move without binding. The plunger spring must not be broken.
- Check the diaphragm bleed-hole and pilot orifice for clogging or tearing. Examine the return springs.
- Replace parts as necessary.

Solenoid Leakage at Sleeve

- Check the sleeve is torqued to 260 – 300 in-lbs.
- If leakage persists, remove sleeve and check cover and sleeve for nicks at the point of contact between the sleeve and cover.
- Replace parts as required.

Solenoid Leakage at Body

- Retighten cover screws with a torque of 50-55 in-lbs.
- If leakage persists, check O-rings are sealing. Check body or cover for damaged sealing surfaces.
- Repair or replace if required.

Error Messages

Error Code	Fault	Solution
Err 3	No price set.	Set a price at the pump or at the controller.
Err 7	Excess flow.	Flowrate has exceeded 100lpm.
Err 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.
Err 9	Faulty or disconnected electronics on V50 meter.	Check meter wiring. Replace meter board.
Err 10	Configuration lost.	Reconfigure C4000. Note: If this fault re-occurs the Memory IC should be replaced (DS1225Y).
Err 12	C4000 memory failure.	Change memory IC (DS1225Y).
:00	The processor supply has been OFF and back ON since the last transaction.	Check mains supply to dispenser. If there is not a supply problem check and replace C4000 Power supply and/or Processor board.
cAL ib	Calibration required.	Check meter K-Factor. The C4000 will recognise that the K-Factor has been viewed and will use the existing K-Factor. If necessary, recalibrate the meter.
Err 50	Modbus meter communication issue.	Check that the meter(s) is plugged in correctly. Check the meter id on the K-Factor switch.
Err 52	Meter issue.	If the error persists, repower the unit. Otherwise a replacement meter may be required.
Err 53	Slug flow.	Check that the inlet valve is open. Check filters and valves for obstructions.
Err 54	Temperature out of range.	Calibrate meter temperature using the K-Factor switch.
Err 55	Dispenser not ready.	If the error persists, repower the unit.
A ir	May suggest air is in the system. May be density out of range, or coil amplitude too low while meter is	Make sure AdBlue pump is running. Check tank and pipework for leaks. Purge system.

	operating, displayed until next sale is started.	Increase the Solenoid delay on the K-Factor switch.
coil	Coil amplitude too low while meter is idle.	Repower the unit. If error persists, replace meter.
888888 then Air after timeout	Air in meter/system or meter problem	Put unit into test mode (see Parameter Settings.) The unit should display temperature and density. Lift the nozzle again. If 888888 is still displayed there is a meter problem and the meter should be replaced. If a density error occurs when the nozzle is lifted, air is in the system or meter. In this case refer to Air error message solution.

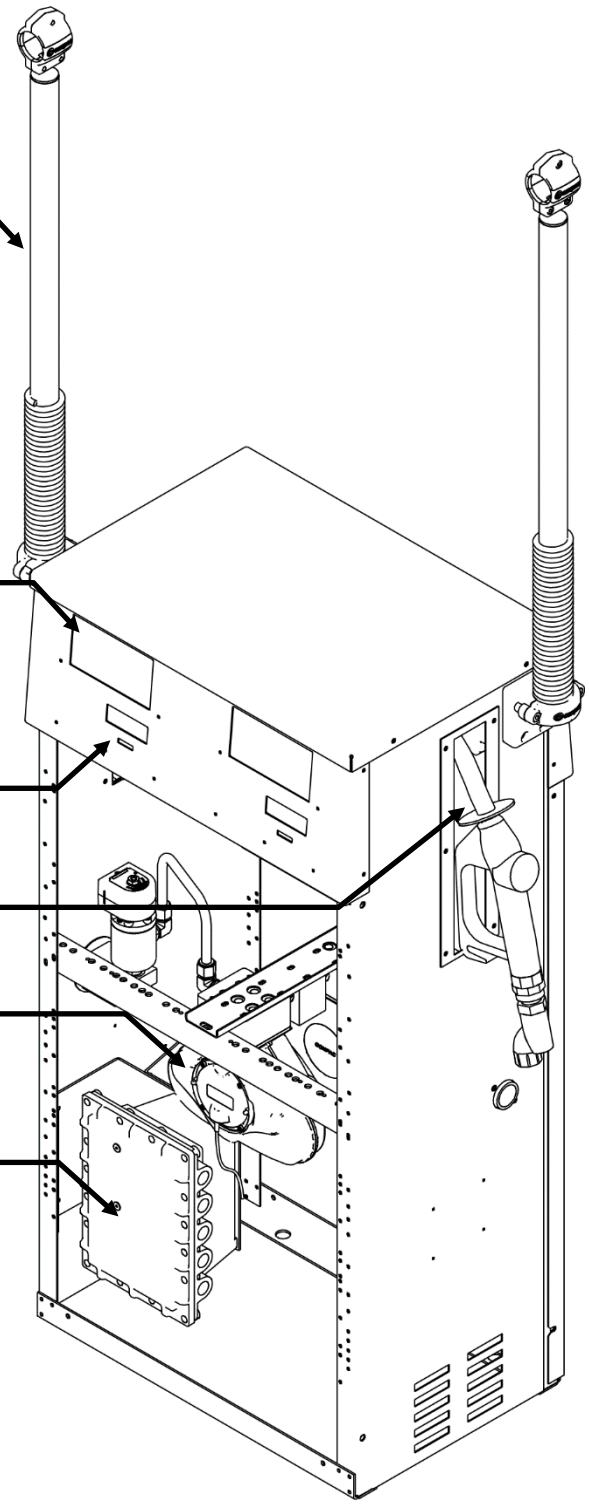
End of Sale Indications

The C4000 can display the reasons the last sale ended. This information is displayed as a number, which appears in the unit price display, when setting the pump number. The following table gives the reasons corresponding to each number.

Numerical Indicator	Readout	Explanation
1	"NOZ"	Nozzle hung up.
2	"PRESET"	Stopped at the preset. For CNG dispensers - completed a temperature compensated fill
3	"TIMEOUT"	No flow.
4	"REMSTOP"	Pump controller initiated stop.
5	"MAX"	Maximum litres and/or dollars reached.
6	"AIR"	Air cut-out (Diesel air cut-out switch).
	"GAS"	Creepage due to vapour (LPG Dispenser).
7	"ERROR"	Encoder error, excess flow, etc.
8	"SEQUENCE"	CNG applications only.
9	"SUMP"	Switch activated by leaking product.
10	“BULK SAFETY”	
11	“NEW CWID”	
12	“DPE MAIN”	Parity error on main display
13	“DPE MP”	Parity error on multi price display
14	“DA MAIN”	Parity error on main display
15	“DA MP1”	Parity error on multi price display 1
16	“DA MP2”	Parity error on multi price display 2
17	“DA MP3”	Parity error on multi price display 3
18	“DA MP4”	Parity error on multi price display 4

19	“LPG CREEP”	
20	“TC1”	CNG Temperature compensated fill stage 1
21	“TC2”	CNG Temperature compensated fill stage 2
22	“TC3”	CNG Temperature compensated fill stage 3

Spare Parts



External Himast complete, with brackets and bolts for mounting
F-HIMAST-W/B

7 digit display with plastic enclosure, excludes rear cover
F-CP-DSPLY-7D1PA

Electromagnetic tote with short fly lead (200mm)
F-BA-TOTE-A-K

ZVA AdBlue nozzle
F-NOZL-ADB-MAG

V50 AdBlue meter complete
F-D-MTR-V50AB

C4000 Power Supply Board Assembly
F-CP-C4PWRASS230

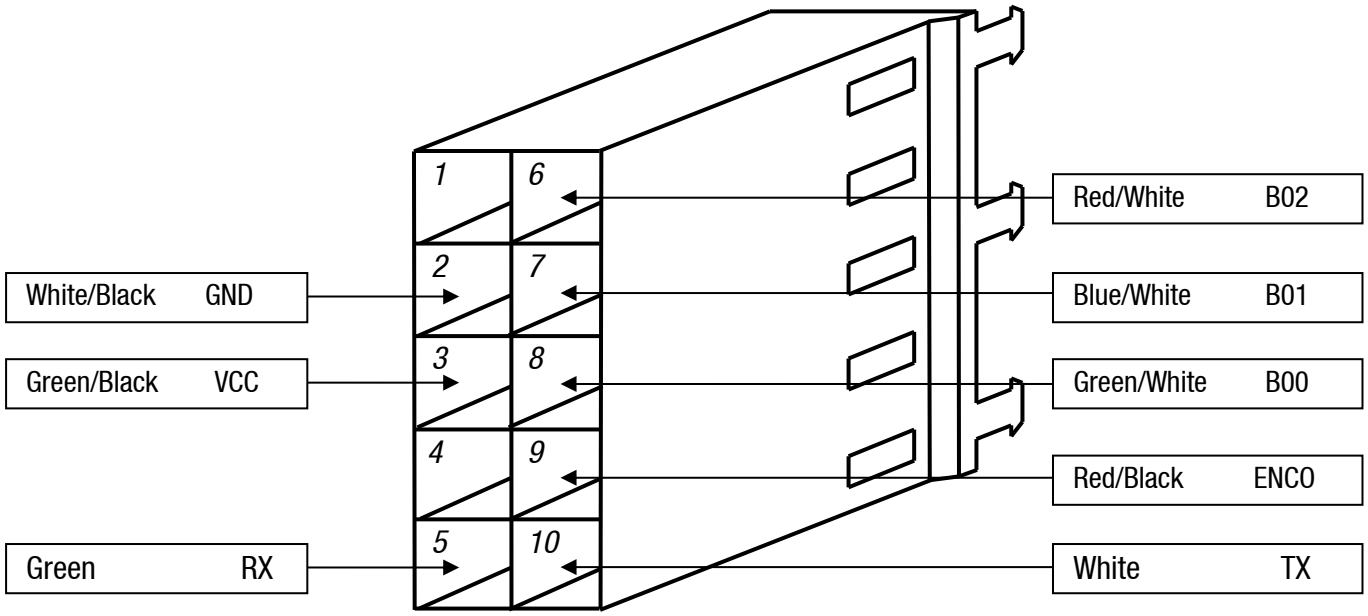
NOT SHOWN:

C4000 Standard software (Aus and NZ): **F-CS-IC-C4DISP**

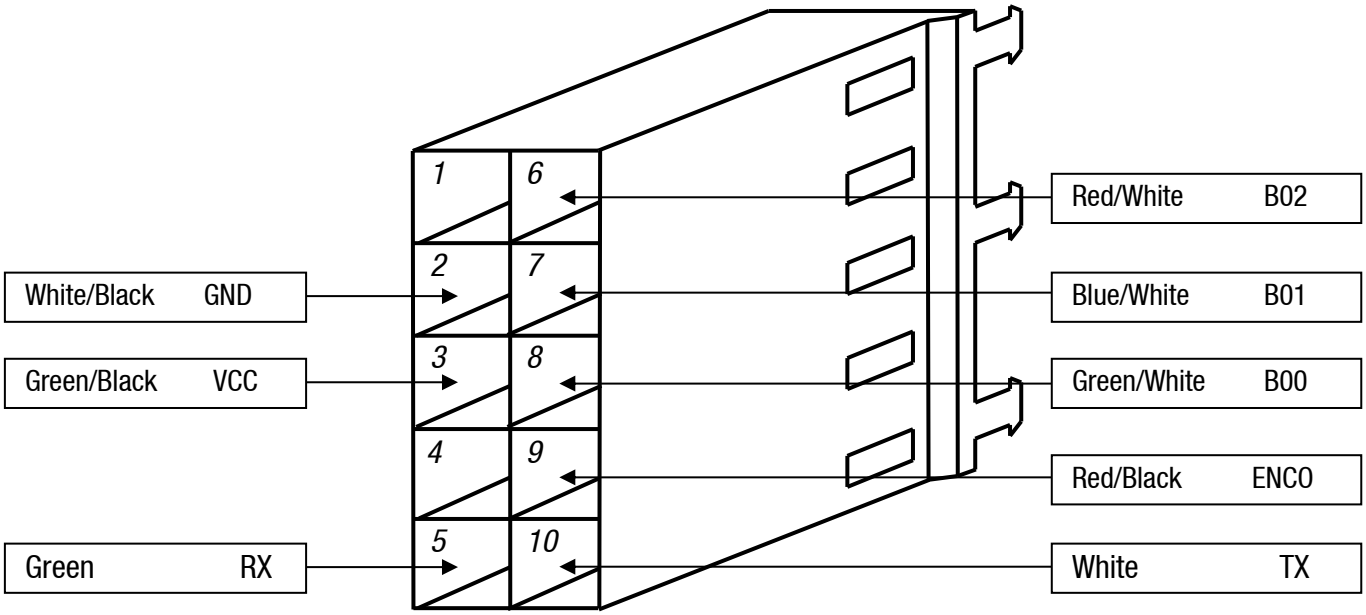
C4000 Hi-speed micro processor board: **F-CP-C4PROCSHSI2**

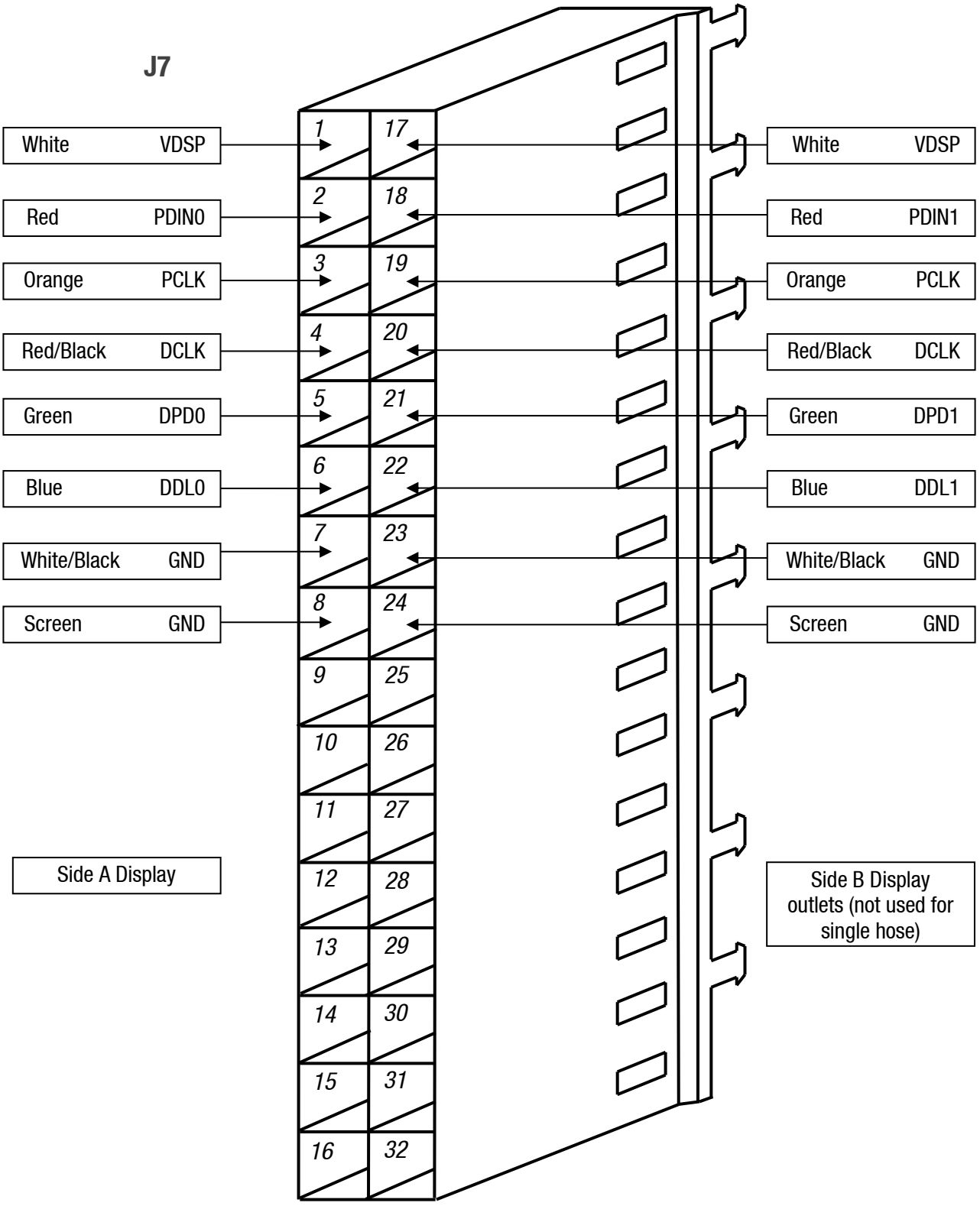
J Cable Connections

J3

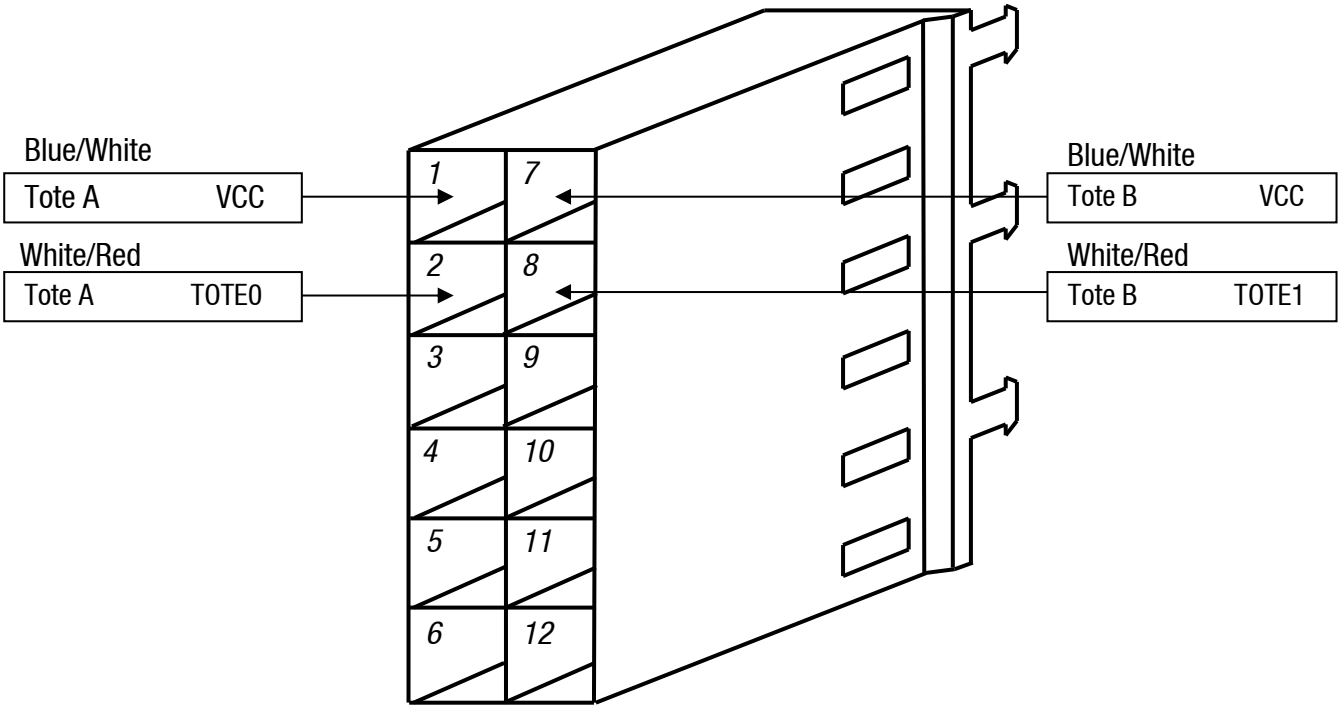


J4

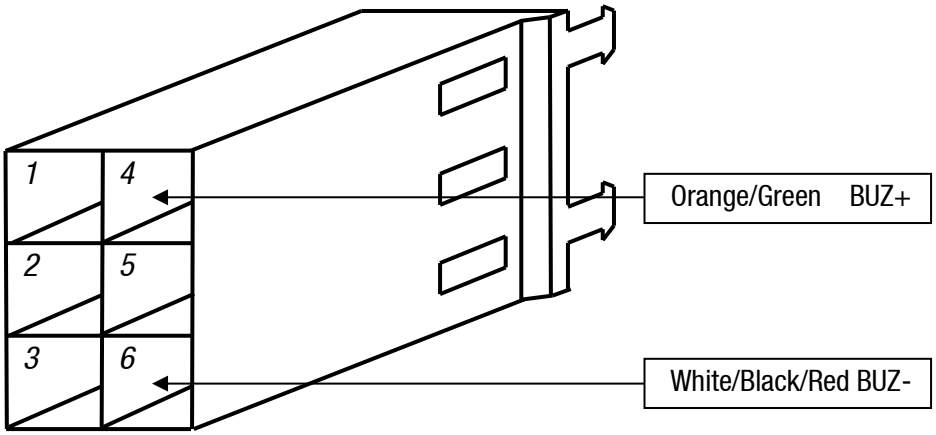



J7
White VDSP
Red PDIN0
Orange PCLK
Red/Black DCLK
Green DPD0
Blue DDL0
White/Black GND
Screen GND
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
White VDSP
Red PDIN1
Orange PCLK
Red/Black DCLK
Green DPD1
Blue DDL1
White/Black GND
Screen GND
Side A Display
Side B Display outlets (not used for single hose)

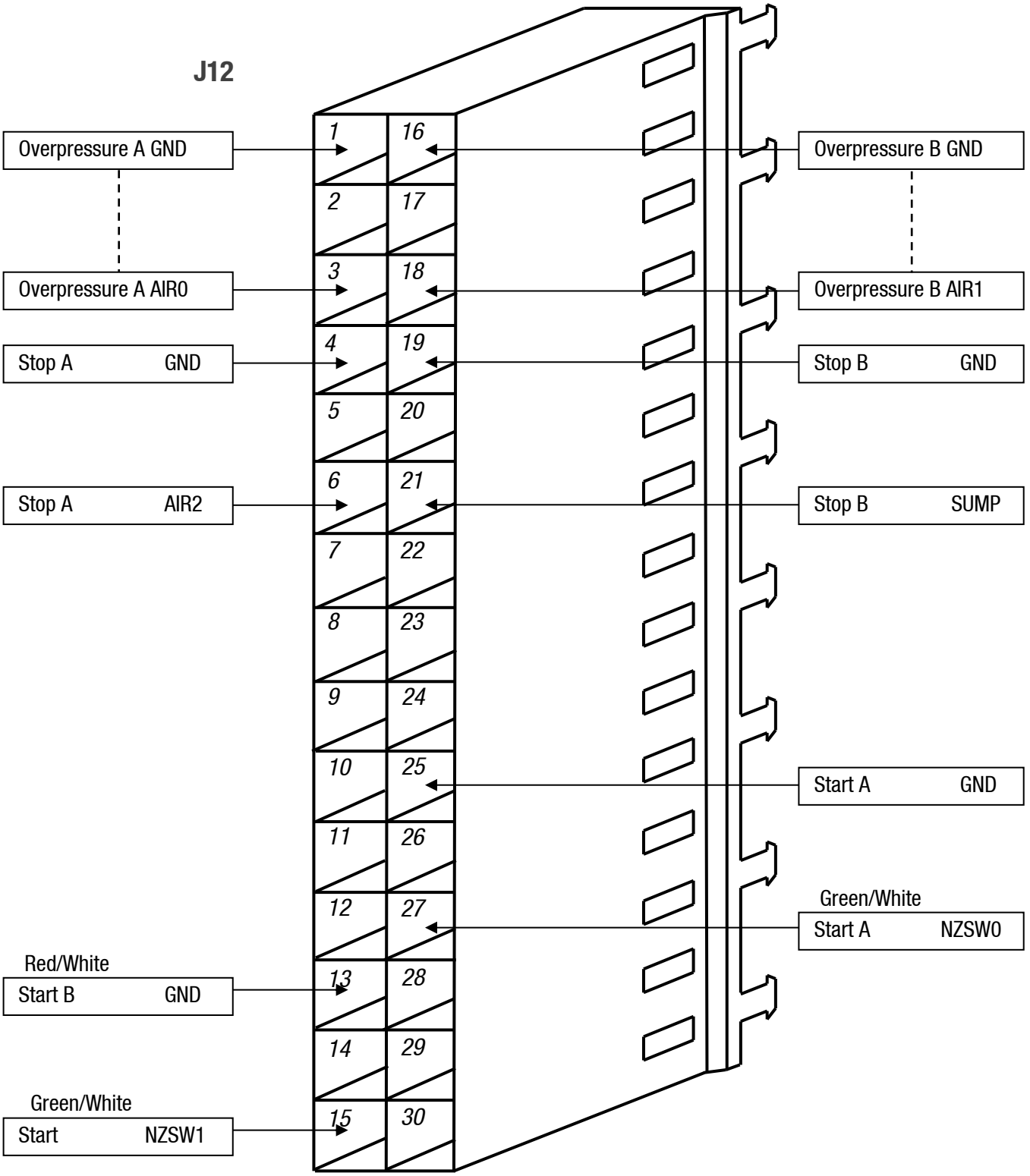
J10


Blue/White
Tote A VCC
White/Red
Tote A TOTE0
1
2
3
4
5
6
7
8
9
10
11
12
Blue/White
Tote B VCC
White/Red
Tote B TOTE1

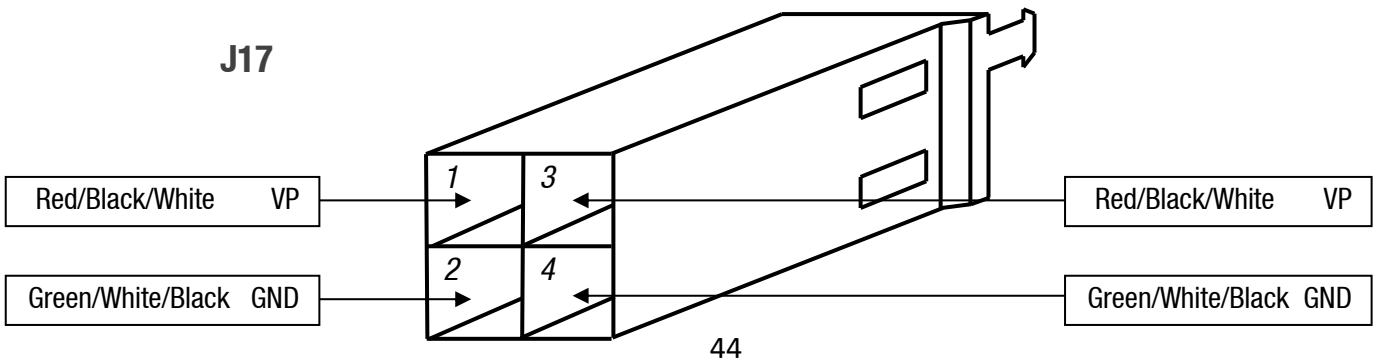
J11


1
2
3
4
5
6
Orange/Green BUZ+
White/Black/Red BUZ-

J12


Overpressure A GND
Overpressure A AIR0
Stop A GND
Stop A AIR2
Red/White
Start B GND
Green/White
Start NZSW1
1
16
2
17
3
18
4
19
5
20
6
21
7
22
8
23
9
24
10
25
11
26
12
27
13
28
14
29
15
30
Overpressure B GND
Overpressure B AIR1
Stop B GND
Stop B SUMP
Start A GND
Green/White
Start A NZSW0

J17


Red/Black/White VP
Green/White/Black GND
1
3
2
4
Red/Black/White VP
Green/White/Black GND