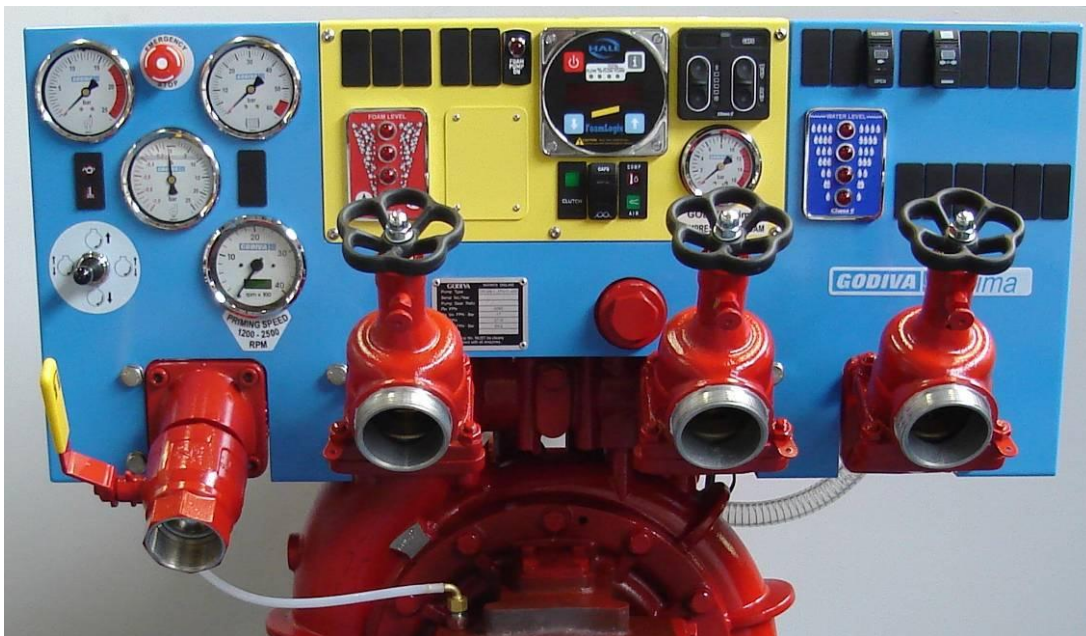


# **GODIVA** *Prima* Pump with Integrated **SmartCAFS**

**Models: PC1\_ or PC2\_ with FoamLogix 3.3, 5.0 or 6.5 and  
SmartCAFS200 (from September 2010)**

## **Installation and Operation Manual**



 **Godiva Ltd.**  
A Unit of IDEX Corporation  
Charles St  
Warwick CV34 5LR  
England

 +44 (0)1926 623600

 +44 (0)1926 623666 / 623689

 [www.godiva.co.uk](http://www.godiva.co.uk)  
[godiva@idexcorp.com](mailto:godiva@idexcorp.com)

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Issue 6, January 2014

## AMENDMENT RECORD

Model: PC1\_ or PC2\_ with FoamLogix 3.3, 5.0, 6.5 Systems and SmartCAFS200 Control

Mod	Date	Page/s	Amendment	New Issue No.
1	September 2010	All	New Issue	Issue 1,
2	August 2011	7, 44	Gauges – do not use solvents. Use mild detergent and water	Issue 2
3	September 2011	28	Additional diagram – Compressor / Oil Water separator location relationship	Issue 3
4	April 2012	10	Gearbox oil capacity – now 1.2 litres	Issue 4
5	April 2012	46	CAFS mixing manifold – greasing ball valve	Issue 4
6	September 2012	7, 43	Information on clutch sparking, normal condition	Issue 5
7	Jan 2013	28	Compressor / Oil Separator tank – revised installation instructions on pipework	Issue 6
8	Jan 2013	9, 37	Insert minimum pump idle speed information	Issue 6
9	Jan 2013	14	Items 11,12,13 – can be located on top row	Issue 6
10	Jan 2013	12	Add details on new Interlock for compressor clutch control	Issue 6

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## INTRODUCTION

This manual contains information relevant to Godiva single or multi-pressure Prima Series Pumps, when partnered with Compressed Air Foam Systems (CAFS) FoamLogix Models 3.3, 5.0 and 6.5 and the SmartCAFS200 control system.

Distinction between the models regarding Installation, Maintenance, Operation and Specification is clearly noted with text and illustrations.

For further information on the FoamLogix 3.3, 5.0 and 6.5 Foam Proportioning Systems, MDTII Manual Dual Tank Selector, Compressor and Intelli-tank Water/foam level display unit, please see the separate manuals supplied.

## IMPORTANT NOTES

Please read this manual before operating the pump.



**CRITICAL:** The pump Bearing Housing, Gearbox and Compressor are **NOT** filled with oil ex works. Refer to section Installation and Set-up (Oil Filling Points) before operation.

Correct lubrication and maintenance is essential if satisfactory performance is to be maintained.

Do not run the pump without water in the pump casing.

The terms 'Left Hand' (LH) and 'Right Hand' (RH) apply when the pump unit is viewed from the suction tube end; for the purposes of this document, this is regarded as the front of the assembly.

## **SAFETY - RELEVANT DATA**

**Thank you for purchasing a Godiva Pump.**

**Godiva Pumps are designed to give safe and reliable service. BEFORE use however, it is essential that the Operating and Installation Instructions are carefully read and understood.**

### **Maintenance**

It is the responsibility of the user to ensure that the equipment is maintained in a safe operational condition. Local legislative conditions may apply. UK only, Maintenance (Regulation 5) of the Provision and Use of Work Equipment Regulations 1998 applies.

### **Training**

It is **ESSENTIAL** that Godiva pumps are operated **ONLY** by **TRAINED PERSONNEL**. Please contact Godiva Ltd. Ltd to discuss your training needs.

Follow the operating procedures laid down in this document and avoid personal injury.

### **Safety Points**

The following points apply to pumps driven by petrol, diesel or other means:

- DO NOT OPERATE the unit close to flammable materials or structures.

- DO NOT SMOKE while operating the unit.

- DO NOT inhale fumes or gases.

- Avoid prolonged skin contact with fluids, particularly if corrosive or carcinogenic.

- When in use, keep ALL UNTRAINED people AWAY from the unit.

- Where appropriate, eye protection should be worn.

- Isolate the electrical supply when working on the pump.

- Batteries produce **EXPLOSIVE GASES**, do not expose to sources of heat and naked flames.

- DO NOT lift heavy weights without assistance.

- DO NOT remove protective guards or shields.

### **Noise**

Operators must wear suitable **EAR PROTECTION** when the pump is running.

### **Gauges**

Do not clean the glass surfaces of the gauges with abrasive or solvent cleaners. These will cloud the glass surface. Use a mild detergent and water.

### **Clutch Engagement**

When the clutch is first engaged it is possible to observe some sparking occurring around the clutch assembly. This small amount of sparking is quite normal and nothing to be concerned about. The lower the engagement speed the less sparking will occur.

## **ENVIRONMENTAL PROTECTION**

It is prohibited to pour engine oil and other contaminants onto the ground, down sewers, drains, or into water courses.

Dispose of lubricants through authorised waste disposal contractors, licensed waste disposal sites, or to the waste reclamation trade.

If in doubt, contact your Local Environmental Agency for advice regarding disposal policies.



## GENERAL DATA

### Compressor

Model	Enduro 12
Maximum Operating Speed	6500 rev/min
Nominal speed of operation	5000 rev/min
Nominal power consumption	40.0kW
Direction of rotation	Anti-clockwise (viewed on pulley)
Volume output	5650 l/min
Operational pressure range	4 to 10 bar

### Pump

Minimum idle speed	900-1000rpm
--------------------	-------------

### Cooling System

Type	Oil / Water Shell & tube type
Cooling water flow-rate	50 l/min at 7.0 Bar

### Foam Proportioning System 3.3 - Class A and B Foam Compatible

Manufacturer	Hale Products Inc
Model	FoamLogix 3.3
Type	Electronic foam proportioning system
Operating voltage	12 and 24 volt systems available
Fuse rating 12V / 24V	60 / 40 amp
Current draw (Operating) 12V / 24V	30 / 15 amp
Current draw (Max) 12V / 24V	60 / 30 amp
Wire size 12V / 24V	Minimum 8.5mm <sup>2</sup>
Max. Foam Agent Flow rate	12 l/min

### Foam Proportioning System 5.0 - Class A and B Foam Compatible

Manufacturer	Hale Products Inc
Model	FoamLogix 5.0
Max. Foam Agent Flow rate	19 l/min
<i>Other data as per FoamLogix 3.3</i>	

### Foam Proportioning System 6.5 - Class A and B Foam Compatible

Manufacturer	Hale Products Inc
Model	FoamLogix 6.5
Max. Foam Agent Flow rate	24 l/min
<i>Other data as per FoamLogix 3.3, 5.0</i>	

### Direction of Rotation - Gearbox Input Flange

Clockwise only - viewed on gearbox input drive flange

## LUBRICANTS

### Compressor

**Recommended:** Screw compressor oil in compliance with ISO Viscosity grade 32 to 46.

**Alternative:** SAE 10W/40 automotive multigrade oil.  
Capacity 12 litres

### Pump Gearbox

**Recommended:** BP Energol GR XP 68 or similar  
Capacity 1.2 litres approximately

### Pump Bearing Housing

**Recommended:** 10W/40 or 15W/40 Multi-grade engine oil. Capacity 1.0 litres approximately

### Model Identification System

Variations of the Godiva Prima pump with CAFS are identified thus:

# P C 1 A 4010

4010 = 4000 l/min @ 10 bar. 3010 = 3000 l/min @ 10 bar  
Main pump output

A = aluminium B = bronze

1 = single pressure 2 = twin pressure

Compressed air foam

Godiva Prima series pump

## RECOMMENDED FOAM AGENTS

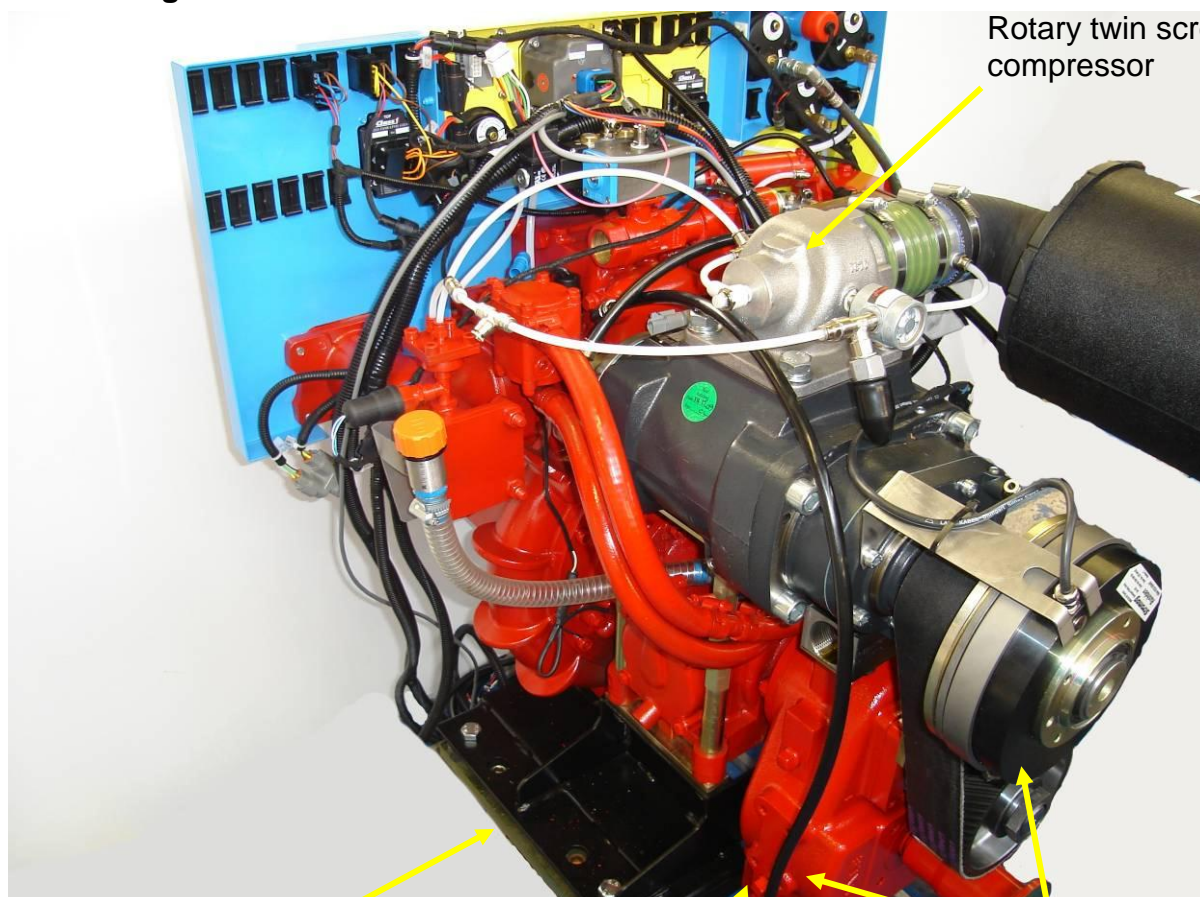
**Hale FoamLogix Models 3.3, 5.0, 6.5 can be used with the foam concentrates specified on the Hale Foam Proportioning System Foam Concentrate Compatibility List provided at the rear of this manual, Hale Bulletin #650, Rev 32 , 7-17-07.**

The foam concentrates in the list have been tested by Hale Products to ensure compatibility with FoamLogix systems. This information is intended to assist the end user in selecting compatible foam concentrate(s) but is not a determination of fire fighting efficiency. Always consult local application and environmental regulations before selecting a foam concentrate and refer to the FoamLogix user manual for additional information.

**Note:** Valid from October 2008. Please contact your Godiva representative if your foam is not listed.

## MAJOR COMPONENTS AND CONTROLS

### General Arrangement



Rotary twin screw compressor

Mounting platform, incorporates forklift points, anti-vibration mountings and fluid drain points

Integral gearbox oil cooler

PTO driven Gearbox with compressor drive via an electromagnetic clutch

### Interlock for Compressor Clutch Control

Models built from mid-2013 are fitted with a solid state device complete with pressure switch indicating LEDs and compressor hours run meter. This unit is primarily of interest to service technicians for CAFS fault diagnosis. The device is located on the left side of the pump.

LEDs for water pressure switch and air pressure switch – will be alight when circuit is closed (no pressure).

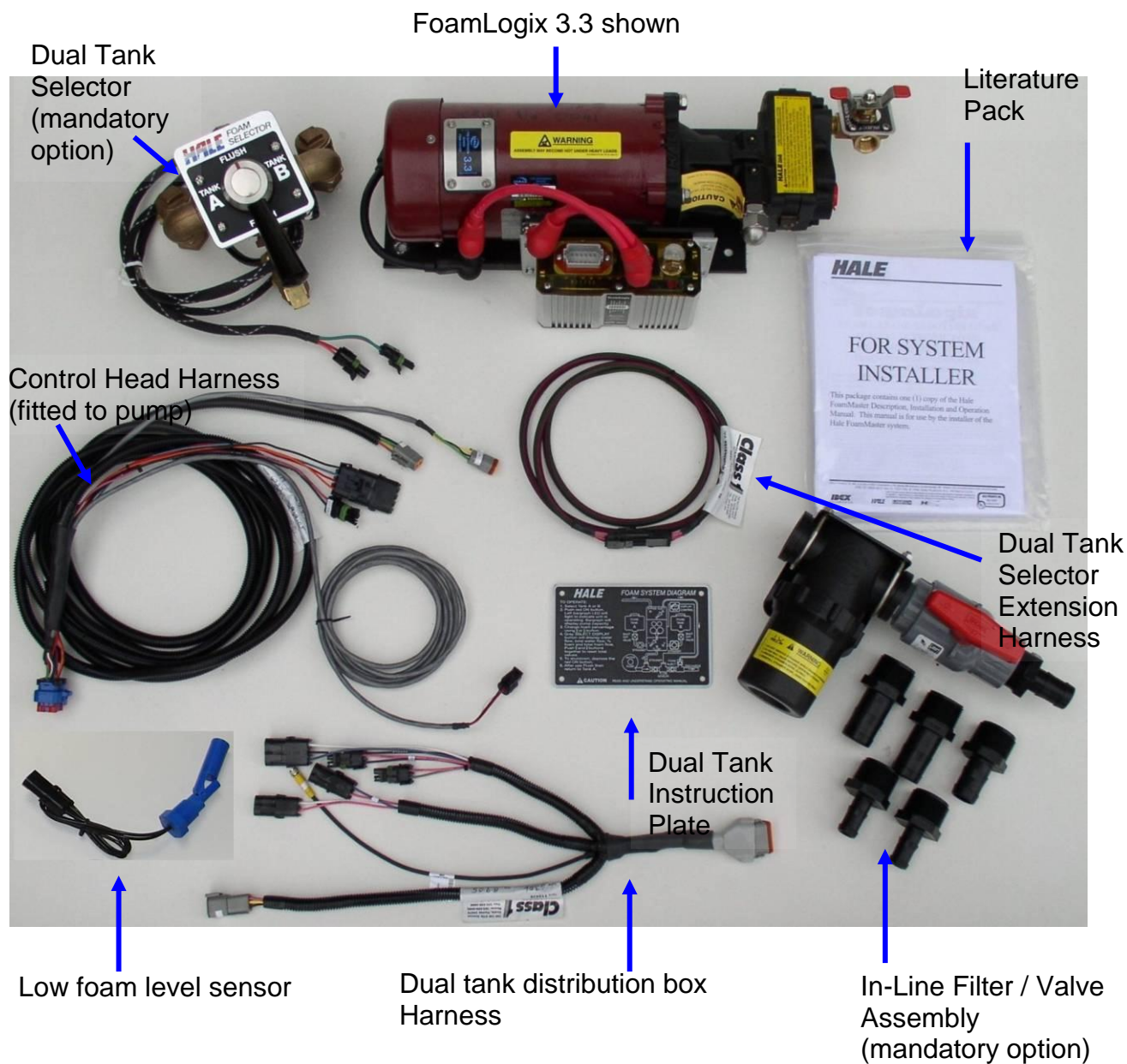


LED – replicates the Air Enabled Indicator on the main panel (see page 14, item 11)

Compressor hours run

## FoamLogix 3.3, 5.0, 6.5 Foam Pump Component Group

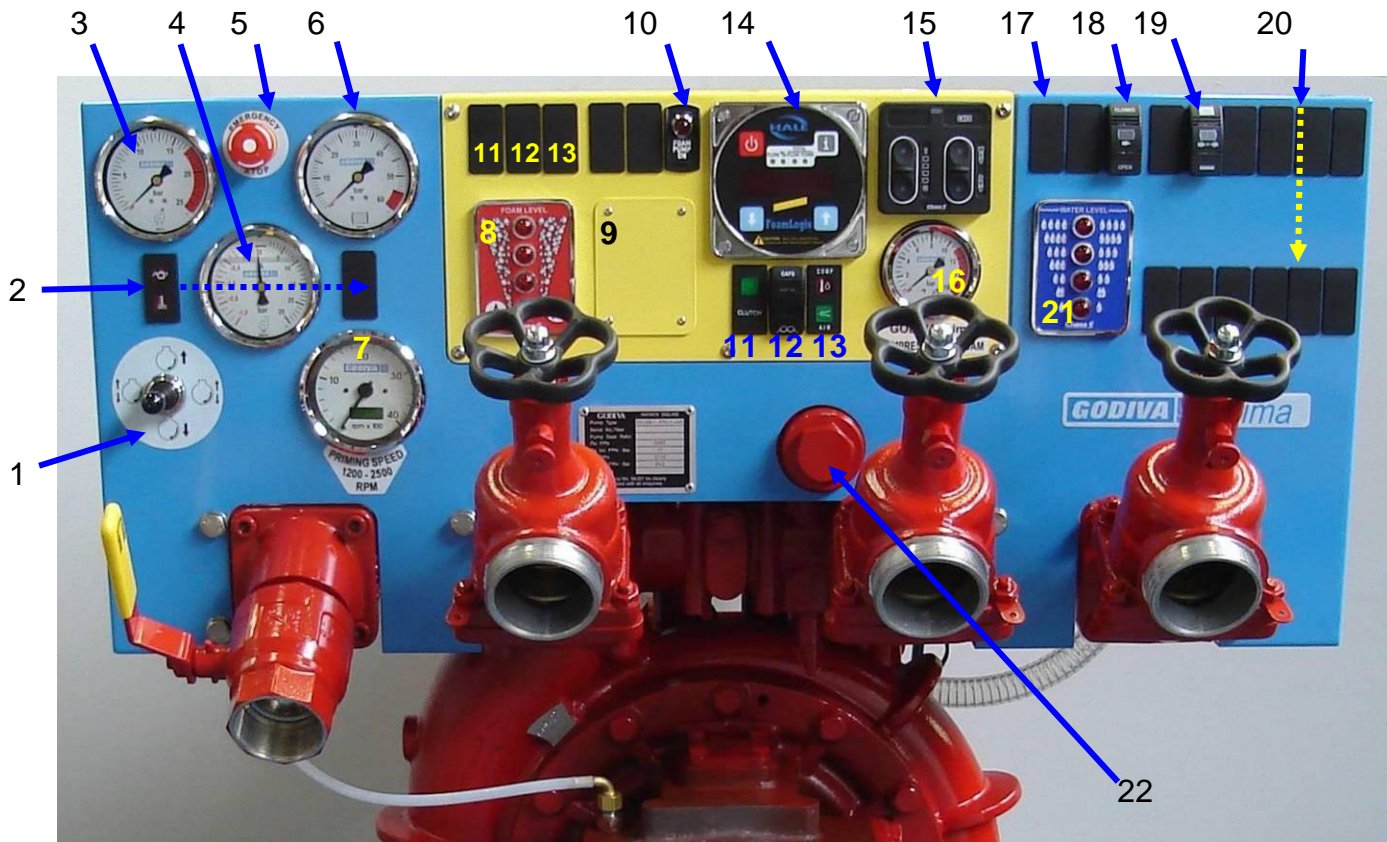
Note: Hale FoamLogix 3.3, 5.0 or 6.5 foam pump is supplied loose for mounting by vehicle builder.





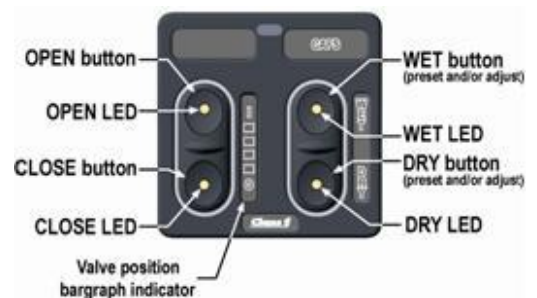
## Control panel FoamLogix 3.3, 5.0, 6.5 - typical

NB: Options and gauge types may vary.



- 1 - Engine speed control - Up = increase, Down = decrease, Left or right = pre-set speeds.
- 2 - Vehicle status lamps: Engine - high coolant temperature. Engine - low oil pressure Vehicle - low battery charge. Vehicle - low fuel
- 3 - Pump low pressure gauge
- 4 - Compound gauge
- 5 - Emergency STOP
- 6 - Pump high pressure gauge
- 7 - Pump Tachometer (rev / min) & Hour counter
- 8 - Foam tank level gauge, Tank A
- 9 - Foam tank level gauge, Tank B – if fitted
- 10 - Foam On indicator
- 11\* - Air Enabled indicator
- 12\* - Solution or CAFS selector switch
- 13\* - Top – Compressor temperature warning light  
Bottom – Air inject on
- 14 - FoamLogix control unit
- 15 - SmartCAFS control unit
- 16 - Compressor pressure
- 17 - High pressure discharge valve LH – open/close, PC2\_ model only – if fitted
- 18 - High pressure discharge valve RH – open/close, PC2\_ model only – if fitted
- 19 - Low / High pressure hose reel selection – pneumatic control option, PC2\_ model only.
- 20 - Spare switch / light locations for other options
- 21 - Water tank level gauge
- 22 - High pressure stage strainer – PC2\_ model only.

Enlarged view of 15



\* 11,12,13 – on later models these switches fitted on top row.

## SYSTEM OVERVIEW

The PC1\_ or PC2\_ is a Compressed Air Foam System comprising of three major components (in addition to the main water pump) – Air compressor (with separate heat exchanger and oil/water separator), FoamLogix (foam proportioning unit) and manifold (foam mixing and control system).

The FoamLogix (foam pump and motor assembly), manifold and compressor heat exchanger and oil/water separator components are mounted separately from the water pump and are designed to be remotely mounted according to the vehicle builders requirements.

A metered amount of foam concentrate is introduced into the Manifold and mixed with water from the pump discharge manifold to produce a solution. The foam and water blend is then fed to a control valve (ARC) where wet or dry foam may be selected (air ratio control section of manifold). Compressed air is then injected and the resulting foam / water / air combination is completely mixed by the X-mixers during discharge.

Safety interlocks are provided to ensure that:

1. Foam concentrate cannot be introduced unless water is flowing through the unit. Compressed air cannot be introduced unless foam concentrate is flowing.
2. 'Slugging' (unmixed air and water) in the discharge line is prevented. Air cannot be injected in the absence of foam and water.
3. Air injection when the foam tank is empty is prevented. Foam tank low level switches are provided and MUST be fitted.

### Compressor

The rotary twin-screw compressor is rated at 200 SCFM @ 10 bar and is driven by a synchronous belt. The compressor is engaged, or disengaged from the pump drive, via an electro-magnetic clutch.

### Oil Cooler

Compressor lubricating oil is cooled by water taken from the main pump, via the water supply line; cooling water being supplied from pump delivery and returned to pump suction. The compressor will reject up to 32.0 kW of heat energy to cooling. The installer must consider this additional thermal load.

When the compressor is stationary, residual system pressure is vented by a blow-down valve.

**NOTE:** The compressor should not be run without cooling water.

### Separator Tank

The separator tank holds the oil required for lubricating the compressor and separates the oil from the oil/air mix discharged from the compressor. The separator tank also has a minimum pressure valve that ensures that air pressure is maintained above 3 bars to maintain correct lubrication.

## Manifold

The manifold incorporates an air ratio control valve through which degrees of wet or dry foam mixture can be selected. Compressed air is then injected and the resulting foam / water / air combination is thoroughly mixed by the X-mixers during discharge.

A By-pass valve is fitted to help obtain the required dry foam flow rate, this valve is adjusted and set during the installation stage, it is not required during normal operation.

CAFS units are best suited for use with Fresh Water.

For salt water compatible foams, seek advice from the foam agent manufacturers.

## FoamLogix - Foam Proportioning System

The FoamLogix system consists of three main components:

- 1) Foam Pump / Motor Assembly.
- 2) Control Panel (integral with main pump control panel).
- 3) Flow measurement and injection manifold.

All three elements combine to provide accurate foam proportioning. From the control panel the operator can initiate the system, adjust the foam ratio, monitor 'real time' water flow rate and record total water and foam concentrate usage.

The FoamLogix system is powered up when the PTO is engaged. Foam concentrate is only injected when the **RED ON** control button is operated.

The Foam ON light (10) will illuminate when the FoamLogix is turned on, and flash when injecting foam.

The FoamLogix 3.3, 5.0, 6.5 system for Class A or B foams, will inject foam in the range of 0.1% to 6.0%.

Further information is available in the **FoamLogix Model 3.3/5.0/6.5** Description, Installation and Operation manual, part number 029-0021-68-0.

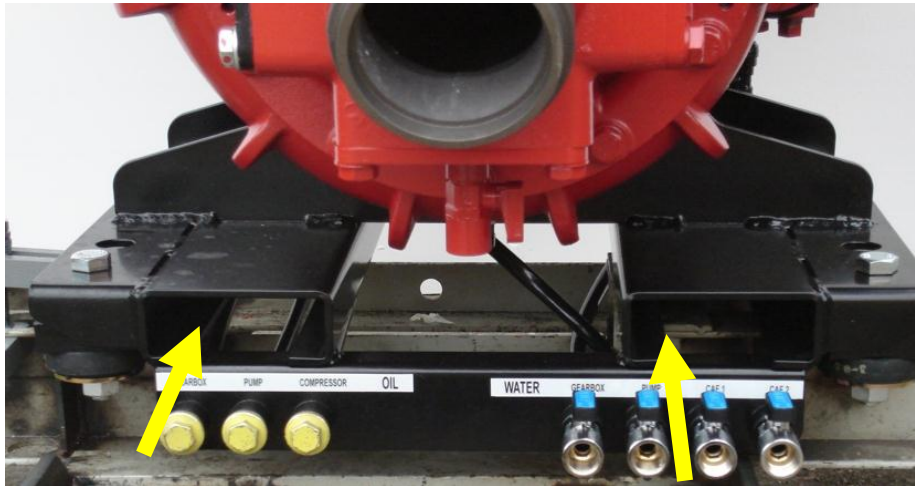


## INSTALLATION AND INITIAL SET-UP

The following connection points should be considered when installing the PC1\_ or PC2\_ assembly into a vehicle.

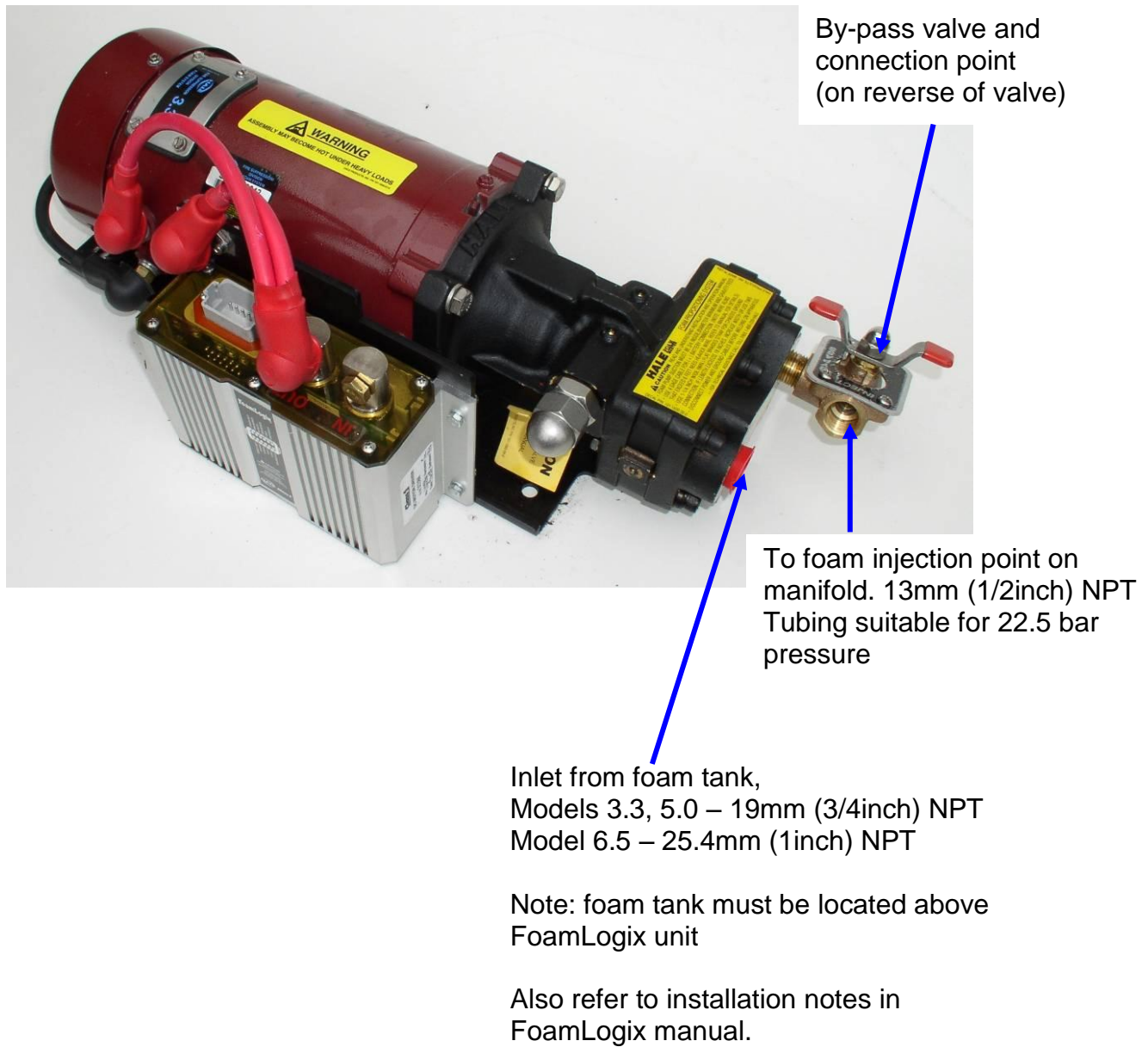
### Lifting Points

Secure handling of the unit for installation and maintenance is vital. Use only the lifting points provided on the unit.



### Fork Lift points

## FoamLogix 3.3, 5.0, 6.5 System – Remote Mounted (Model 3.3 shown)



## Fluid Drain Points

Pump bearing housing, and gearbox oil drain points are located at the lower left side of the pump (viewed from the suction tube end).



Gearbox coolant and the pump drain points are located at the lower right hand side of the pump.

## Oil Filling Points

The unit is supplied **without** oil and must be filled with the correct quantity and specification before starting the pump.

## Bearing Housing

The oil filling point for the pump bearing housing is located on the right side of the pump (viewed from suction tube).

Pump bearing housing  
- oil fill point



Pump bearing housing -  
oil level dipstick.

The dipstick is accessed  
from the left side of the  
pump.

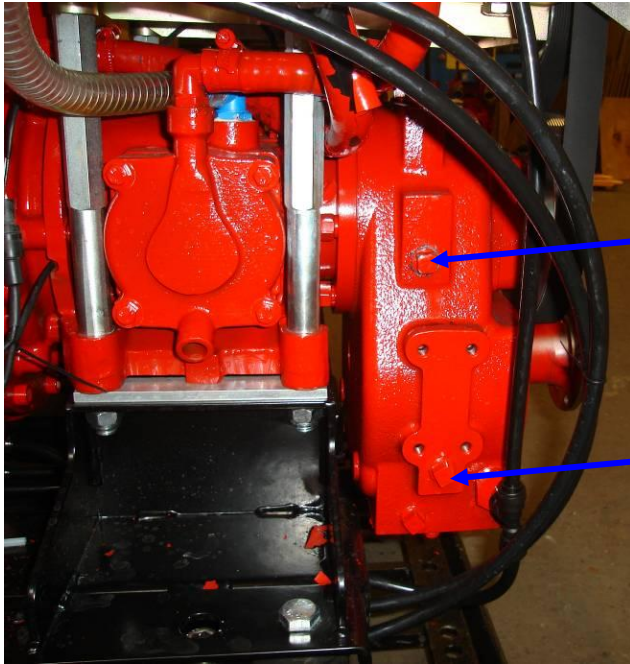
The correct level is  
when the oil is between  
the upper and lower  
marks.





## **Gearbox Oil Filling and Checking – vertical position**

When the gearbox is in the vertical position, an oil fill point and oil level check point are located on both sides of the housing.



Gearbox oil fill point

Gearbox oil level check point

Fill the gearbox until the oil flows from the oil level check point. This is the only accurate method of checking that the correct amount of oil has been added to the gearbox, as it allows for different sizes of gear ratios. Approximate capacity is 1.2 litres.

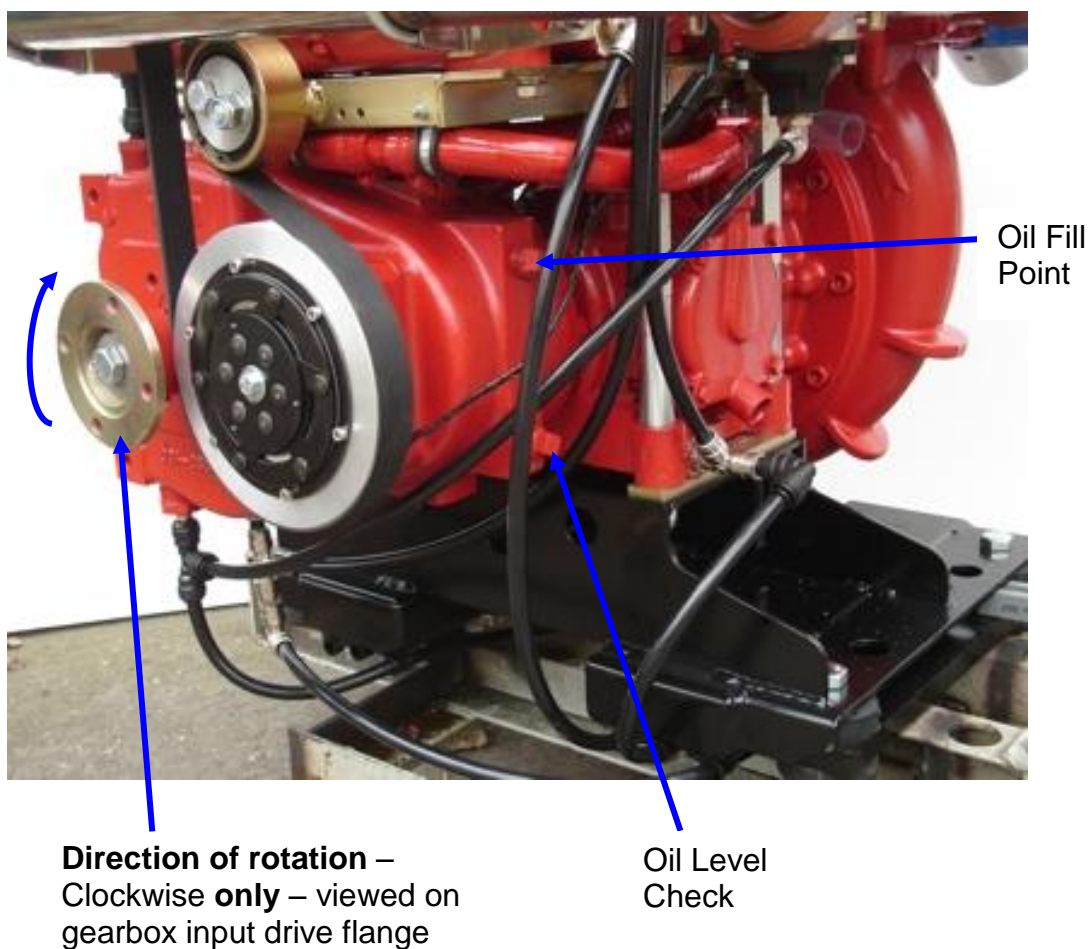
## **Gearbox Oil Filling and Level Checking - Horizontal Position, Left or Right of pump**

The oil filling point is on the side of the casing (LH gearbox shown) and is symmetrically opposite for RH gearbox.

The oil level check point is lower on the side. Oil capacity and type as Down position detail.

Fill the gearbox until the oil flows from the oil level check point. This is the only accurate method of checking that the correct amount of oil has been added to the gearbox, as it allows for different sizes of gear ratios. Approximate capacity is 1.2 litres.

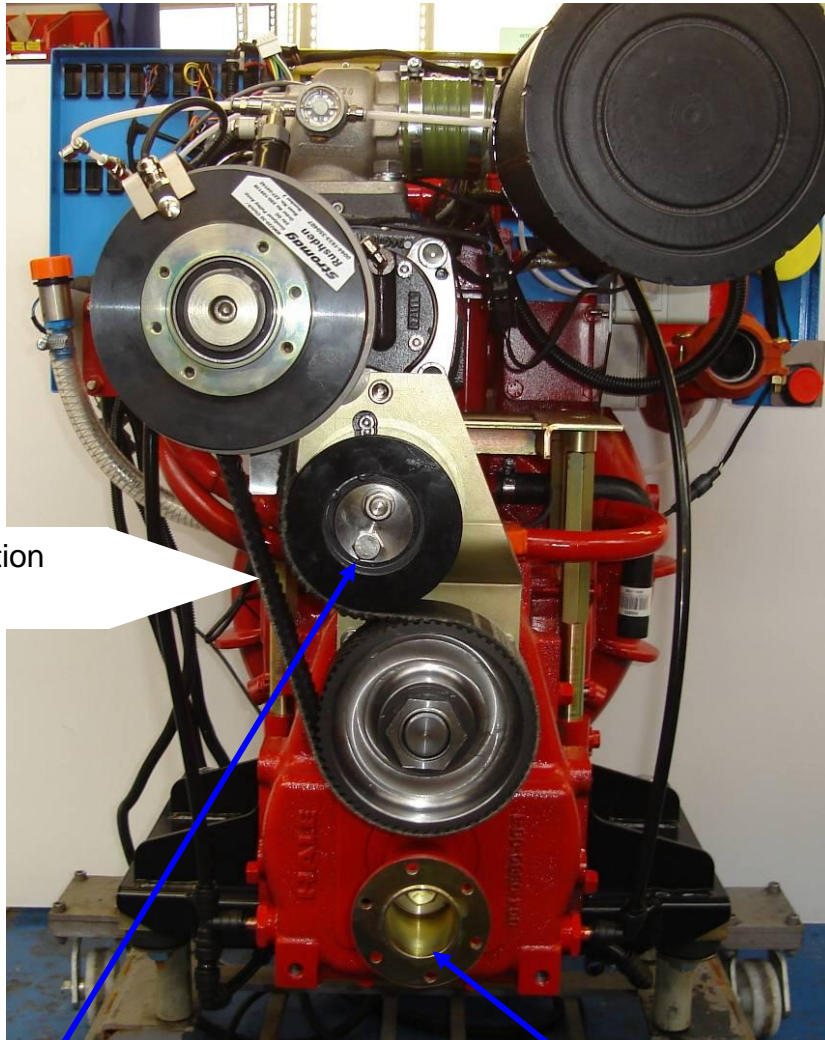
Pump shown is a Prima SmartCAFS50 unit, the gearbox oil fill and level check points are the same for the Prima SmartCAFS200 pump.



The oil drain points (pump bearing housing, gearbox and compressor) are located at the front of the mounting platform., see page 19.

## Compressor Drive Belt

The compressor is driven by a Goodyear Eagle PD synchronous drive belt..  
The installer must allow for access to adjust the belt tensioner. Tension the belt to achieve a 5mm deflection with a load of 145N (new belt) or 108N (used belt) applied at mid span, see photograph below.



5mm belt deflection  
At mid span

Belt Tensioner Assembly -  
Slacken bolt, rotate belt  
tensioner to achieve specified  
deflection and secure

PTO drive flange connection  
Various specifications available.

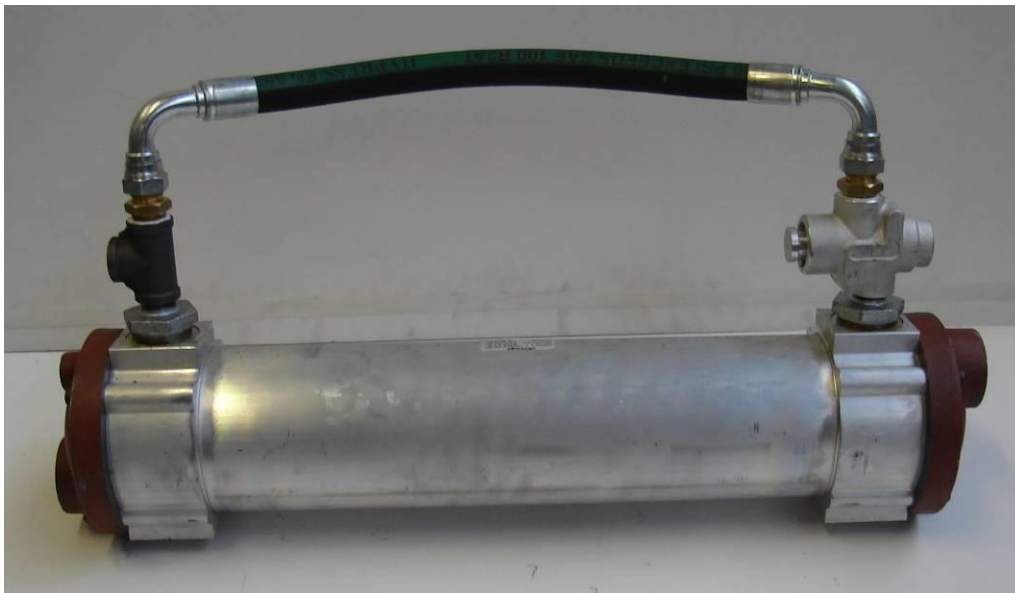


## Separator Tank for Compressor Oil



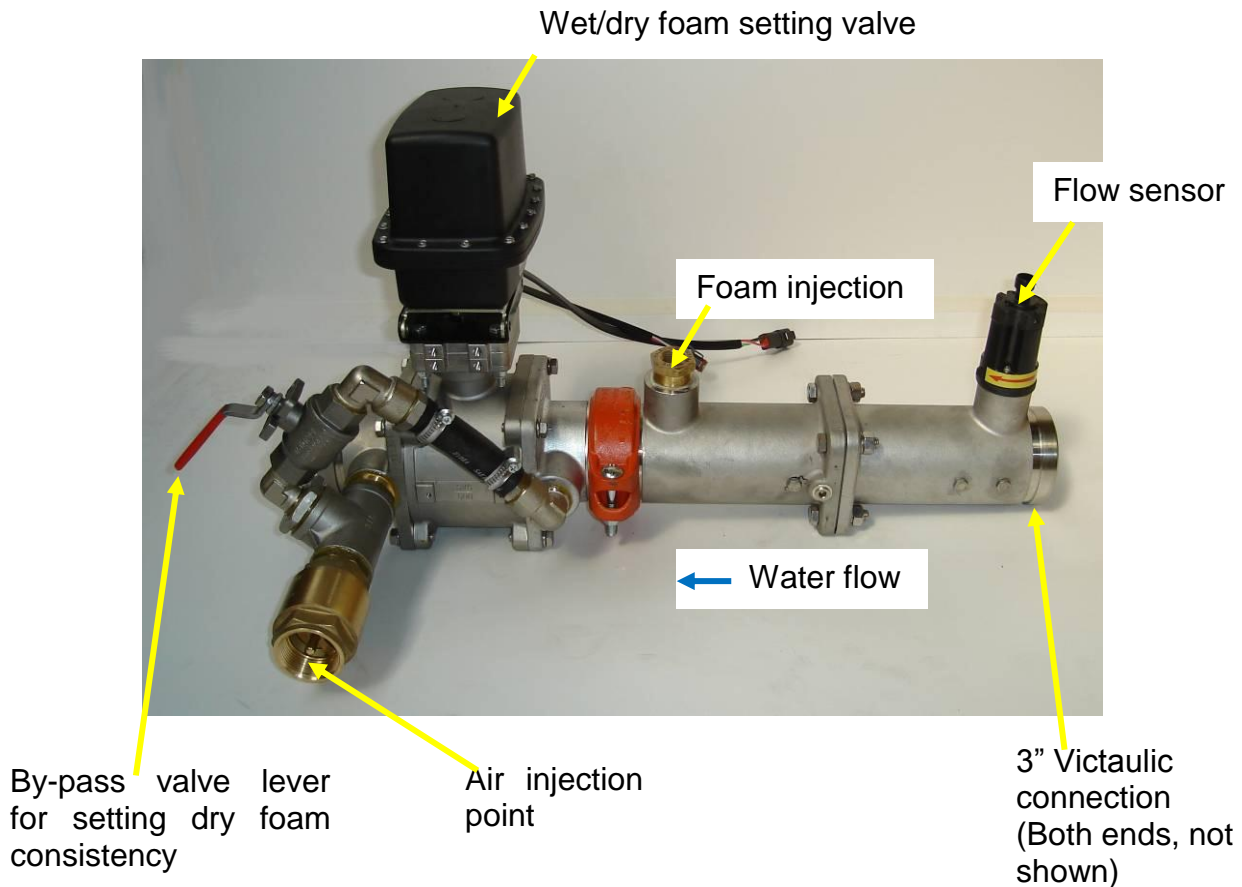
**Note.** Separator must be installed in the vertical position as shown. Pipework from compressor to oil tank must be arranged so that any oil in the compressor will drain back to the tank.

## Compressor Oil Cooling Unit





## SmartCAFS Mixing Manifold



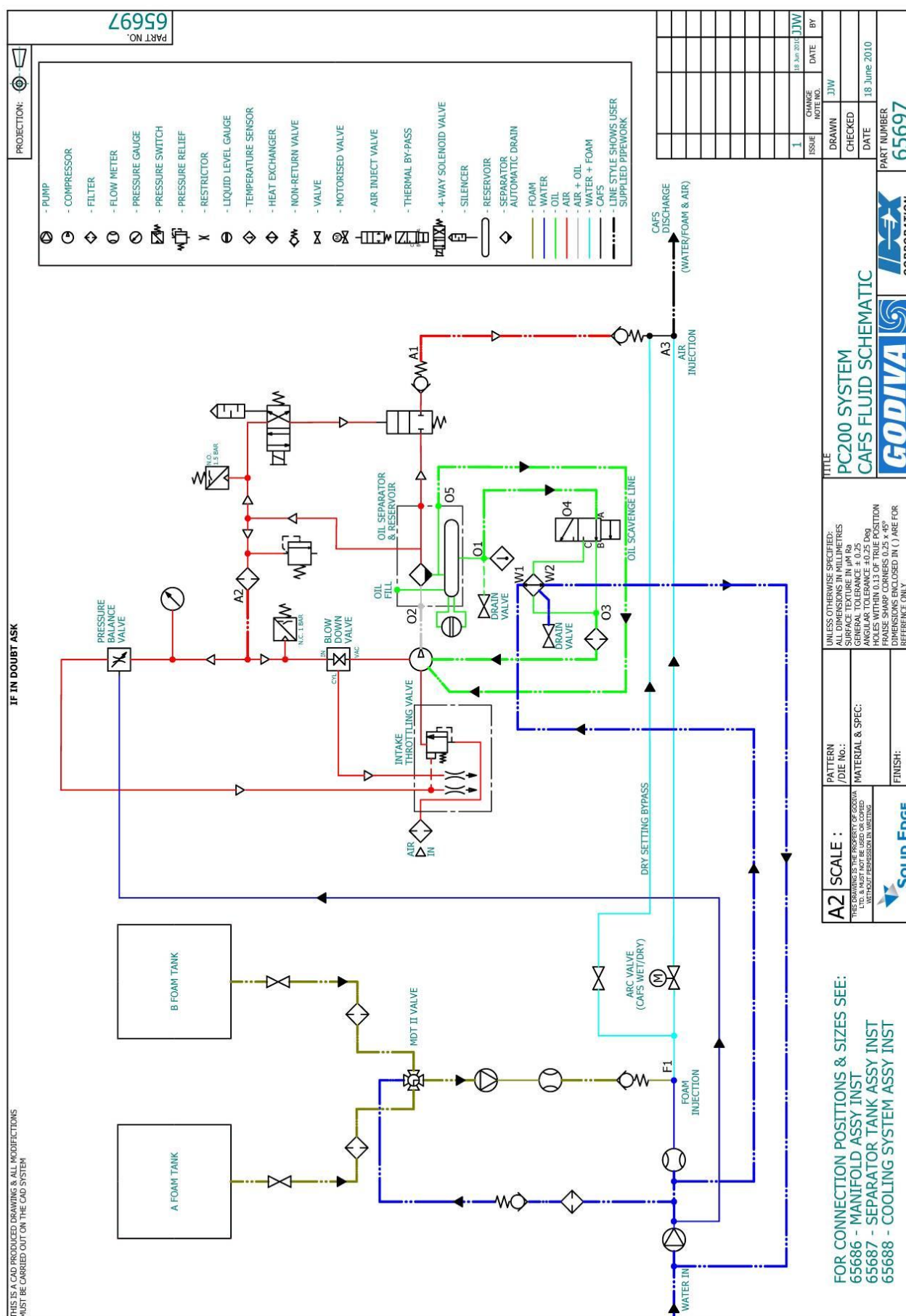
Manifold should be mounted with provision for drainage.  
Foam and air injection points identified above.

### By-Pass Valve

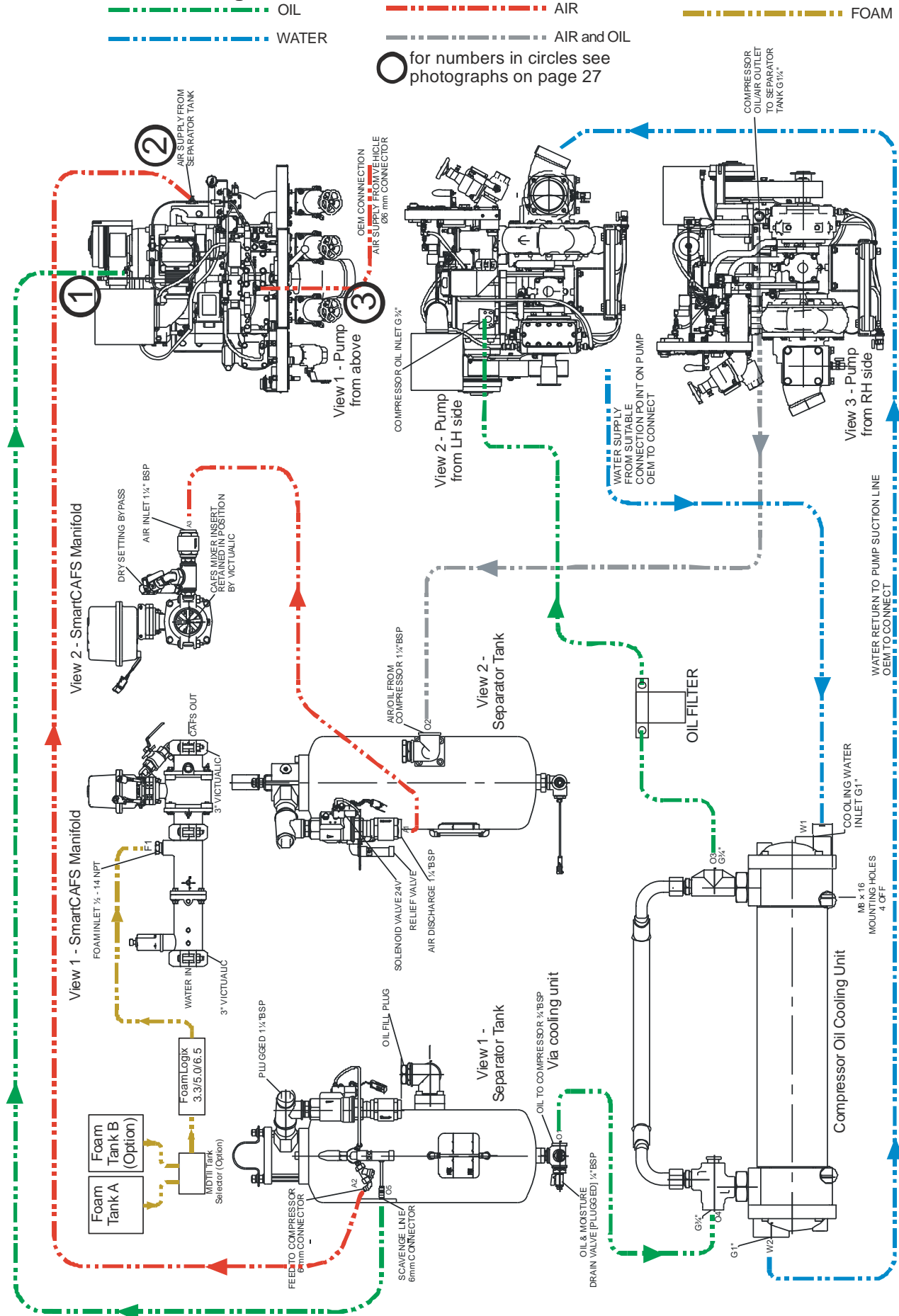
This valve is adjusted to give the required dry foam flow-rate - typically 100 litres/minute.  
To set the required dry foam constituency –

1. Install the system as directed
2. Run the system at normal operating pressure, discharge compressed air foam through the most restrictive line, typically a hose reel.
3. Set the SmartCAFS ARC control to the full dry position.
4. Open or close the By-pass valve (as shown in photograph above) until the required dry foam flow rate is achieved.
5. Remove the By-pass valve lever so this setting cannot be changed in operation.

### Schematic - CAFS Fluid

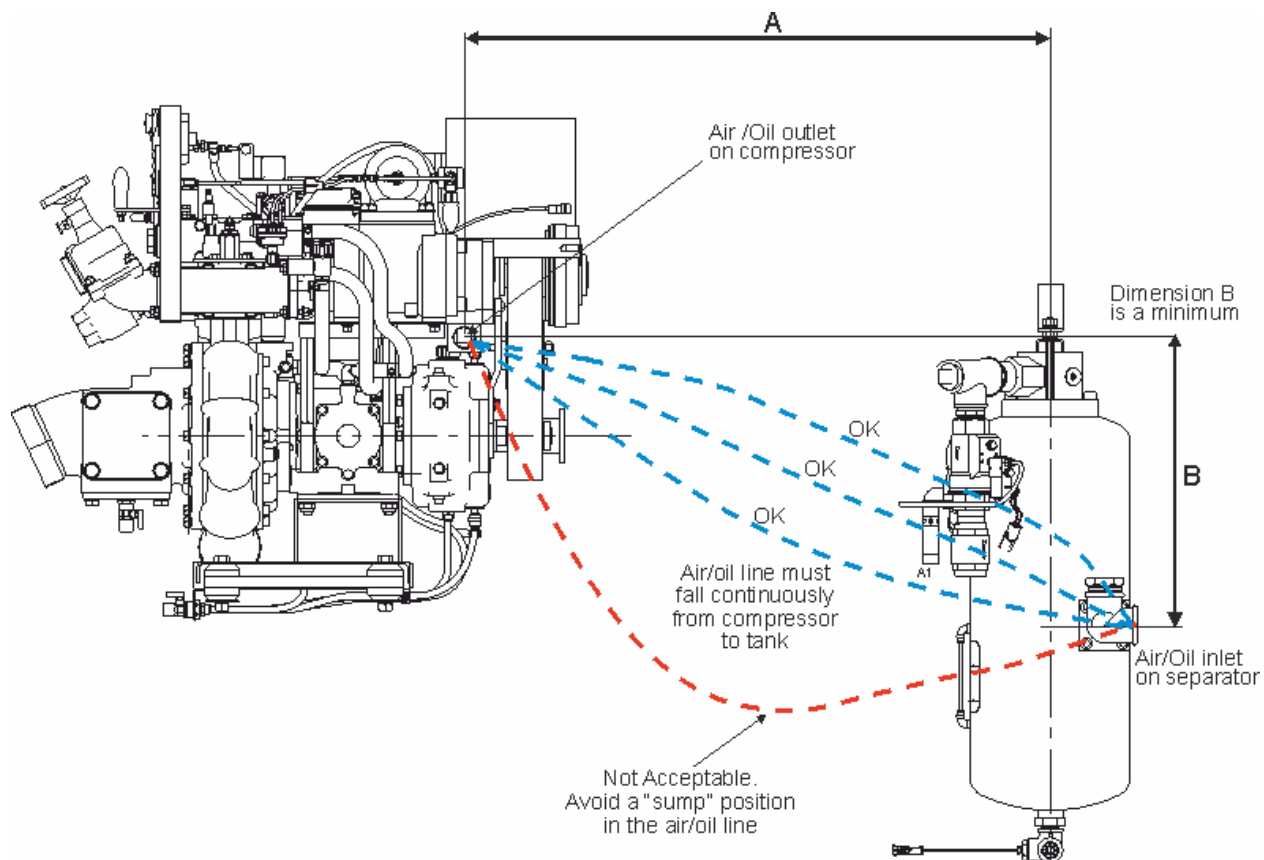


## Schematic – Plumbing Connections – Part 1



## Compressor and Separator tank – Relative positions in installation

Please observe the relationship between compressor air/oil outlet and separator air/oil inlet connections when installing



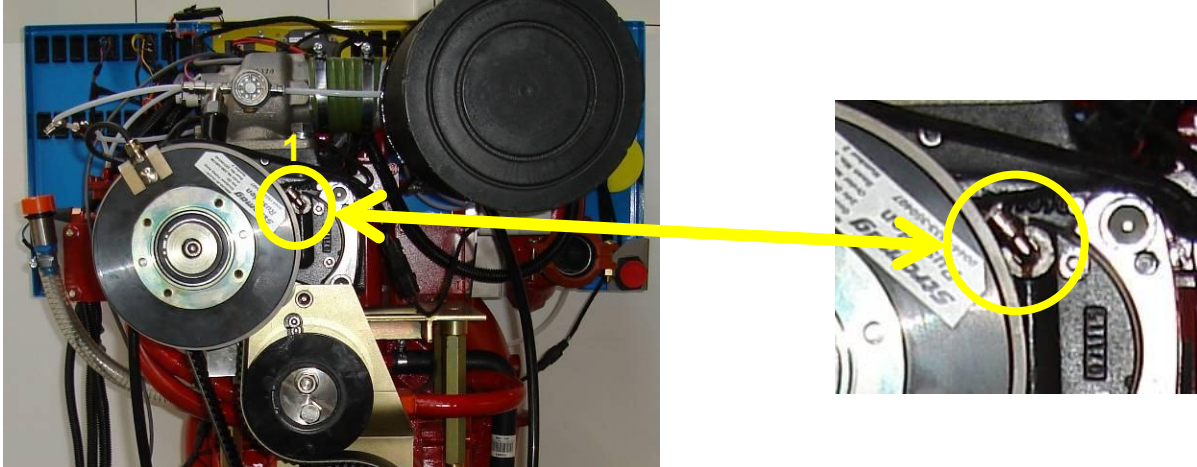
A	B	A	B
300	50	950	212.5
350	62.5	1000	225
400	75	1050	237.5
450	87.5	1100	250
500	100	1150	262.5
550	112.5	1200	275
600	125	1250	287.5
650	137.5	1300	300
700	150	1350	312.5
750	162.5	1400	325
800	175	1450	337.5
850	187.5	1500	350
900	200	1100	250

Example –  
If distance A is 300mm, then distance B must be at least 50mm

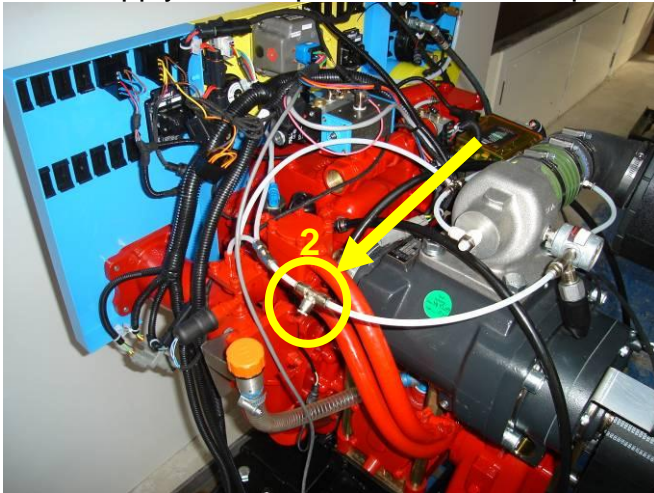


## Schematic – Plumbing Connections – Part 2

1. Oil scavenge line from separator tank to 6mm connection on rear of compressor

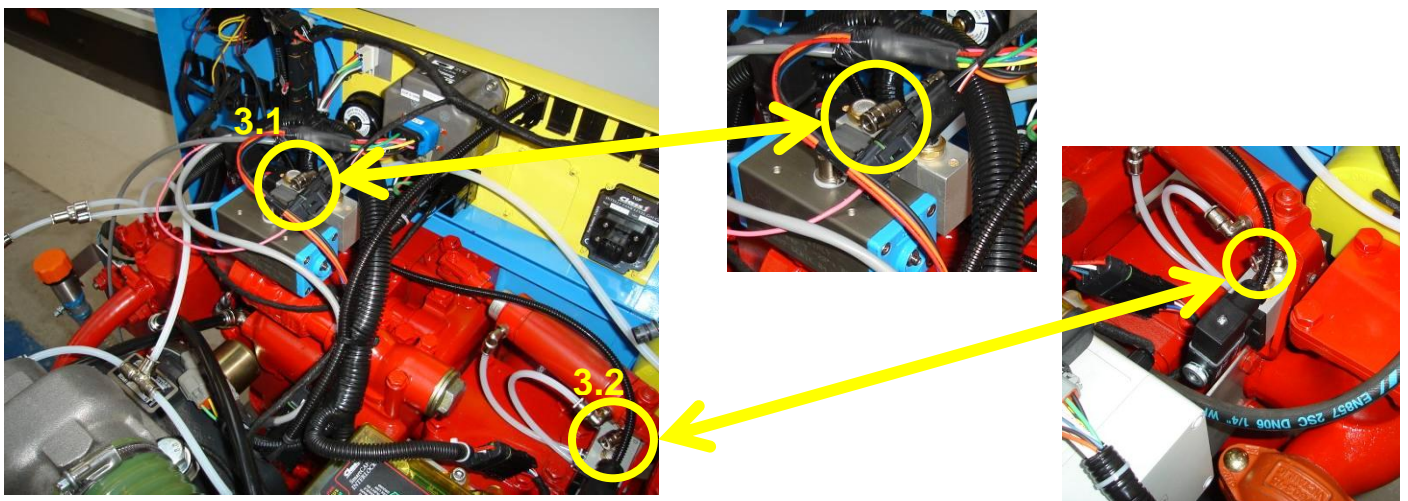


2. Air supply from separator tank to compressor, 6mm tubing/connector.

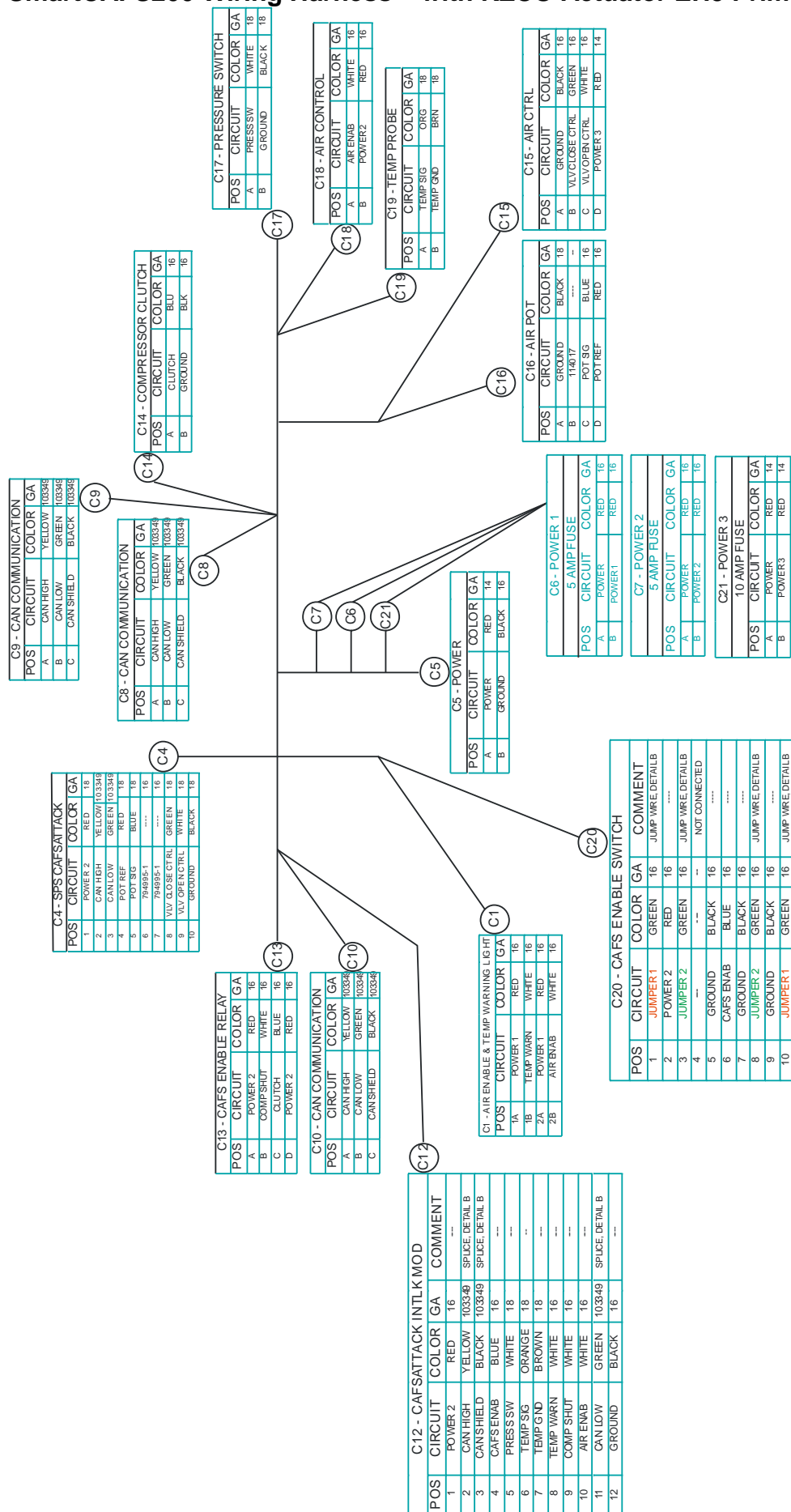


3. Air pressure for pump functions, connect from vehicle supply with 6mm tubing -  
 3.1 - High Pressure discharge, pneumatic operation of valve - if option fitted.  
 Note this model features one HP discharge valve. Two discharge valves will be supplied from a T piece.

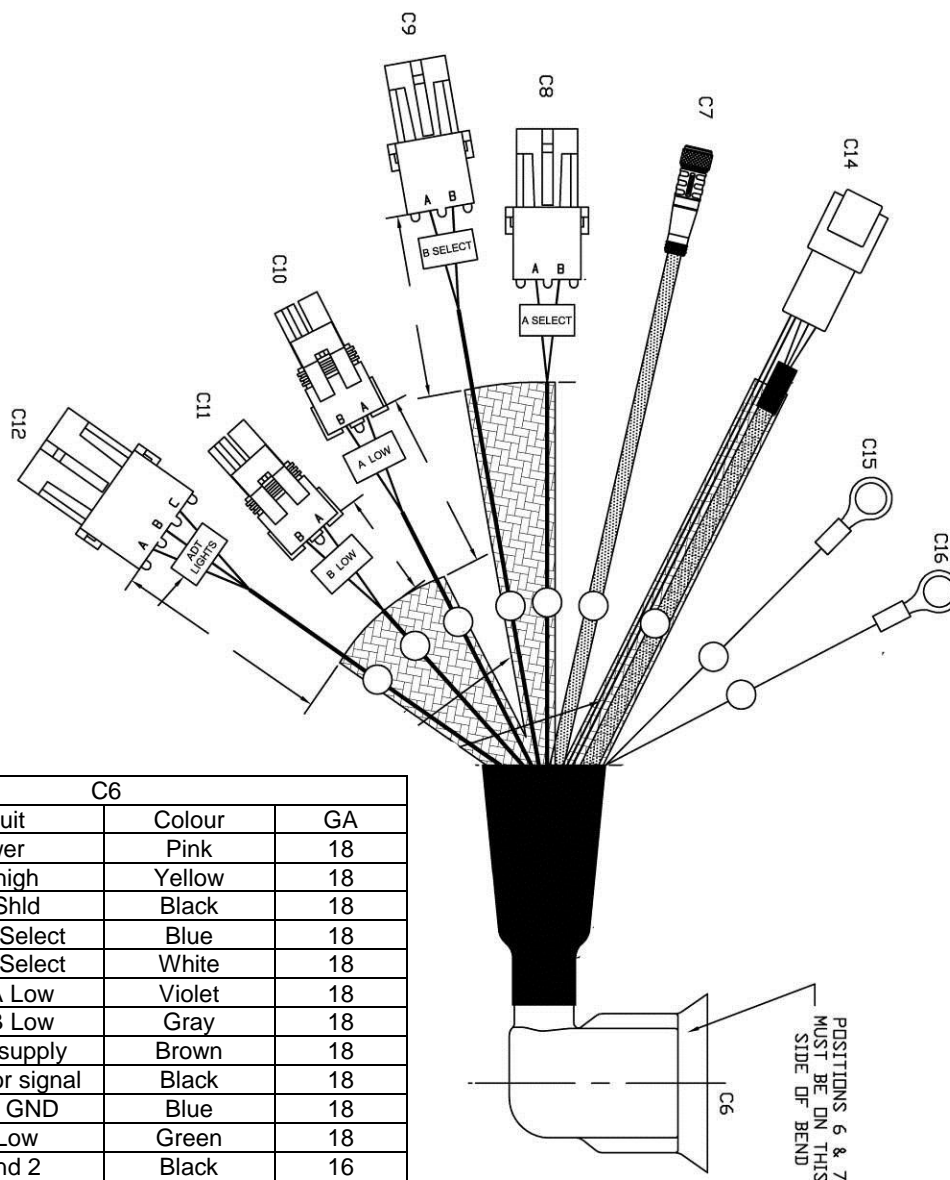
3.2 - High/Low pressure selector valve (pneumatic operation) – if option fitted.



## SmartCAFS200 Wiring Harness – with KZCO Actuator EH5 Prima



## Foam Pump Harness Diagram



C6			
Pos	Circuit	Colour	GA
1	Power	Pink	18
2	Can high	Yellow	18
3	Can Shld	Black	18
4	Tank A Select	Blue	18
5	Tank B Select	White	18
6	Tank A Low	Violet	18
7	Tank B Low	Gray	18
8	Sensor supply	Brown	18
9	Ind sensor signal	Black	18
10	Sensor GND	Blue	18
11	Can Low	Green	18
12	Ground 2	Black	16

C16			
Pos	Circuit	Colour	GA
1	Ground 2	Black	16

C15			
Pos	Circuit	Colour	GA
1	Ground 1	Black	16

C14			
Pos	Circuit	Colour	GA
1	Power	Pink	18
2	Can high	Yellow	18
3	Can Shld	Black	18
4	Ground 1	Black	16
5	Can Low	Green	18
6	Plug 114017	-	-

C7			
Pos	Circuit	Colour	GA
1	Sensor supply	Brown	18
2	Ind sensor signal	Black	-
3	Sensor GND	Blue	-

C8			
Pos	Circuit	Colour	GA
1	Power	Pink	18
2	Tank A Select	Blue	18

C9			
Pos	Circuit	Colour	GA
1	Power	Pink	18
2	Tank B Select	White	18

C10			
Pos	Circuit	Colour	GA
1	Power	Pink	18
2	Tank A Low	Violet	18

C11			
Pos	Circuit	Colour	GA
1	Power	Pink	18
2	Tank B Low	Gray	18

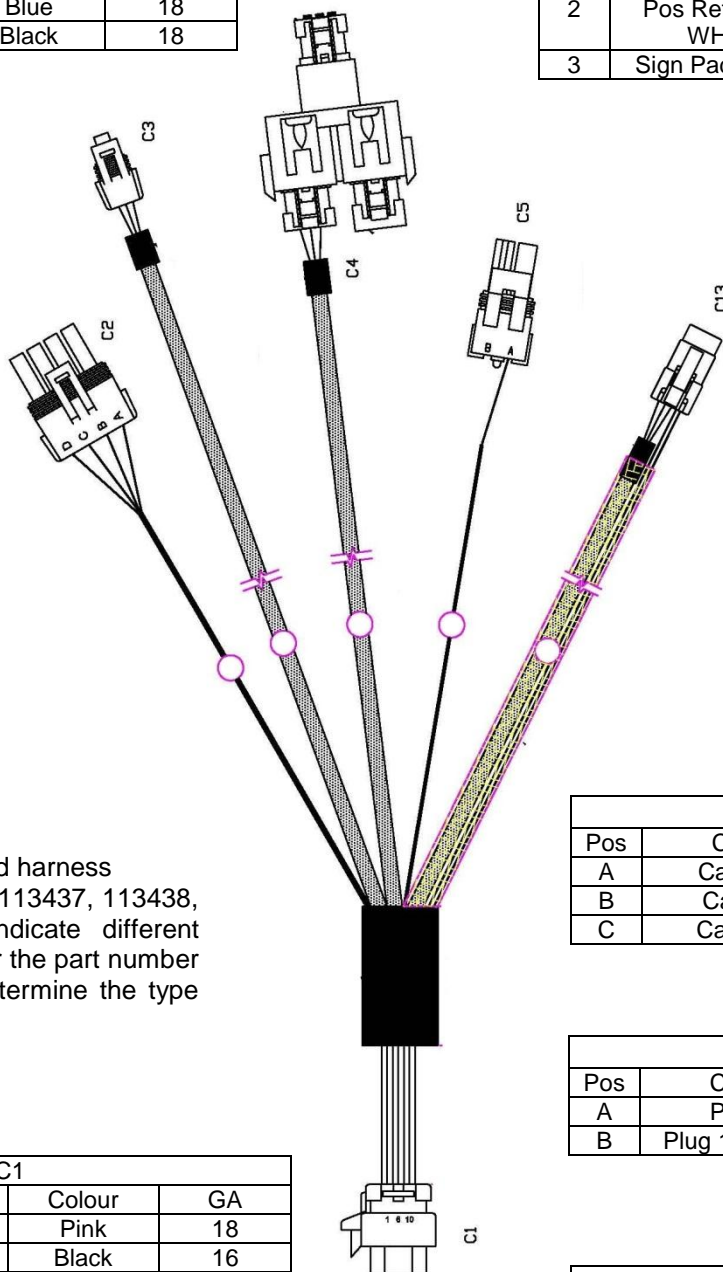
C12			
Pos	Circuit	Colour	GA
A	Tank A select light	Blue	18
B	Ground 2	Black	16
C	Tank B select light	White	18



## SmartCAFS200 Wiring Harness

C2			
Pos	Circuit	Colour	GA
1	SW No	Orange	18
2	Remote LED (-)	Red	18
3	Remote LED (+)	Blue	18
4	SW Common	Black	18

C3			
Pos	Circuit	Colour	GA
1	GND Ref PAD WHL	Black	18
2	Pos Ref PAD WHL	Red	18
3	Sign Pad WHL	White	18



Requires connection to foam pump

FoamLogix control head harness  
Part numbers 113436, 113437, 113438, 113439, 129496 – indicate different lengths. Please look for the part number on your harness to determine the type you have.

C4			
Pos	Circuit	Colour	GA
A	Can high	Yellow	18
B	Can low	Green	18
C	Can Shld	Black	18

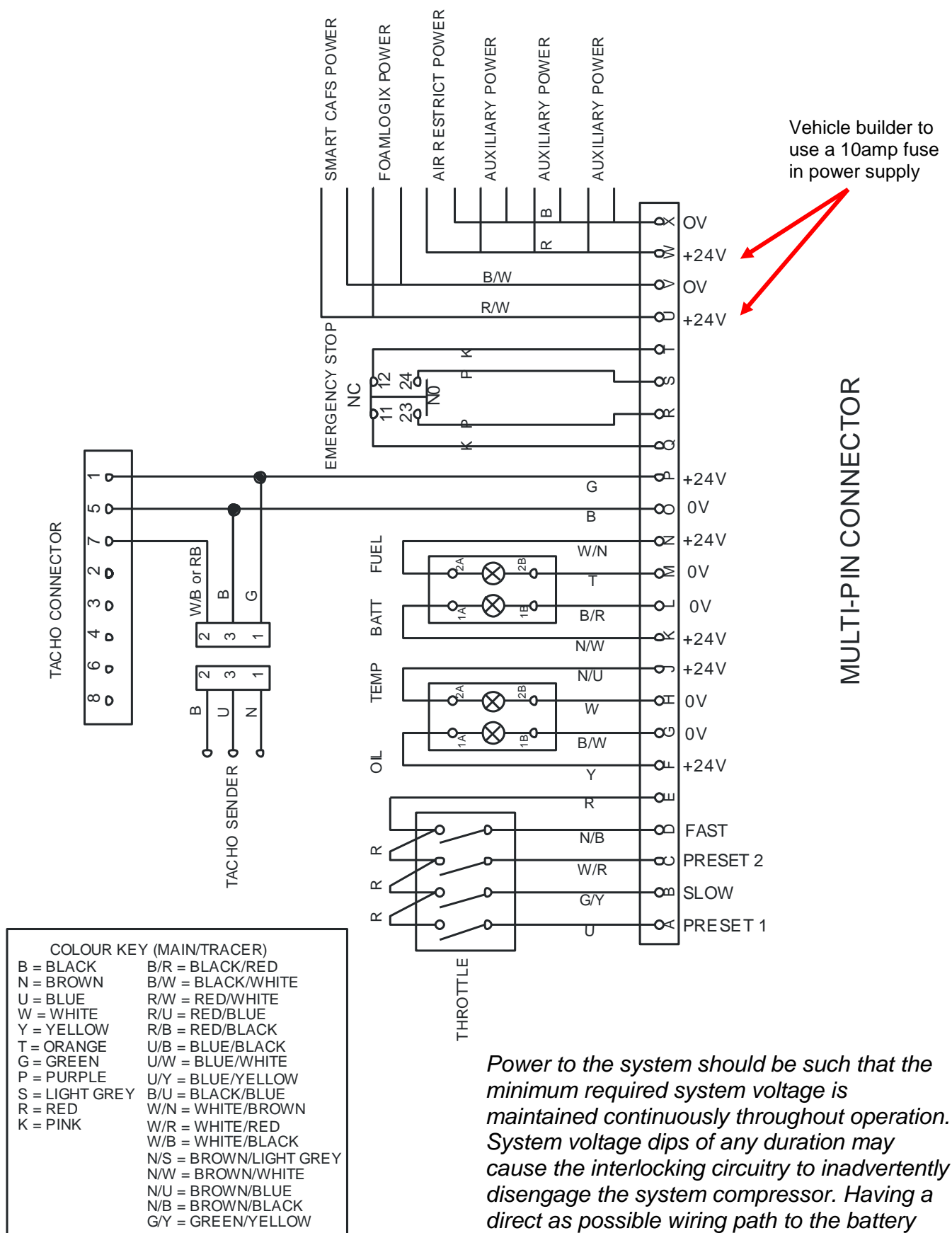
C5			
Pos	Circuit	Colour	GA
A	Power	Pink	18
B	Plug 12010300	-	-

C1			
Pos	Circuit	Colour	GA
1	Power	Pink	18
2	Ground	Black	16
3	SW No	Orange	18
4	SW Common	Black	18
5	Remote LED (+)	Blue	18
6	Remote LED (-)	Red	18
7	Pos Ref PAD WHL	Red	18
8	Sign Pad WHL	White	18
9	GND Ref PAD WHL	Black	18
10	Can high	Yellow	18
11	Plug 770678	-	18
12	Plug 770678	-	18
13	Plug 770678	-	18
14	Can Low	Green	18

C13			
Pos	Circuit	Colour	GA
1	Power	Pink	18
2	Can high	Yellow	18
3	Can Shld	Black	18
4	Ground	Black	16
5	Can low	Green	18
6	Plug 0413-204-2005	-	-



## Prima SmartCAFS Engine Control Schematic



Power to the system should be such that the minimum required system voltage is maintained continuously throughout operation. System voltage dips of any duration may cause the interlocking circuitry to inadvertently disengage the system compressor. Having a direct as possible wiring path to the battery supply may help to mitigate this type of situation.

### Foam Tank Low Level Sensor

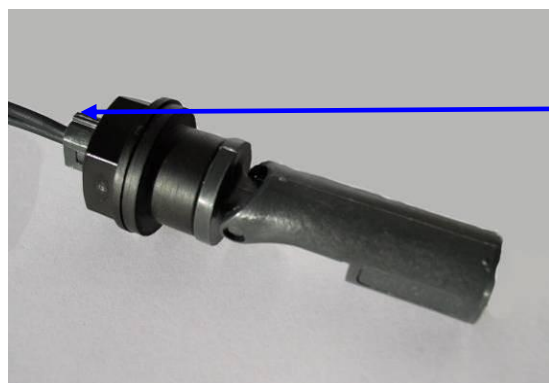
The unit is supplied with a connector for a low foam level sensor. The sensor is supplied with the unit ready for installation (instructions supplied with the sensor).

The low foam level sensor is part of the Safety Interlock system and must be installed.

**Note:** The low foam level sensor must be installed in the tank in the correct orientation. The sensor has a raised boss on the casing and must be installed with this boss at 12 o'clock (top).

The foam tank requires a 23mm hole for secure fitting of the switch device and the maximum allowable thickness of the tank wall material is 4mm.

The centre of the level switch should be located a minimum of 40mm above the foam concentrate outflow to the foam pump.



Boss location

### Additional Installation Points

#### Foam Tank to Foam Pump

The foam feed line must not at any point be lower than the foam pump and be fitted with an isolating tap for maintenance purposes. The isolating tap should be located as close to the tank as possible. A flushing point should be fitted close to the isolating tap to ensure that the maximum length of hose line can be flushed out. The flushing line should also be fitted with an isolating valve.

Foam supply line I.D.	Class A	19mm minimum
	Class B	25.4mm minimum

**The foam tank must be located to provide a positive head of foam concentrate to the FoamLogix unit, and the supply hose should be arranged to fall gradually from the tank to the foam pump inlet to avoid air pockets. A tank drain valve must also be fitted.**

The foam tank should be made of plastic or stainless steel, with a volume greater than the vehicle main tank by a factor of 0.005. Alternatively, a volume of at least 25 litres may be preferred to allow an entire drum of foam agent to be contained.

**Note:** To ensure correct operation of the FoamLogix pump, all connections must be secure and pressure tight.

## VEHICLE DESIGN CONSIDERATIONS

**The following information is included to assist the vehicle builder to achieve a successful installation.**

The in-line foam strainer / valve assembly is a low-pressure device, rated at 3 bar and will NOT withstand high flushing water pressure.

Seal all electrical power and ground connections with silicone sealant to prevent corrosion.

The system will not operate correctly with poor electrical connections. Verify all electrical connections prior to start up.

Each Hale FoamLogix system is tested at the factory using the wiring harness provided. Improper handling and abuse of connections will cause harm and may result in other system damage.

Use fixings which are compatible with those foam concentrates used. Brass or 300 series stainless steel are suitable.

The areas containing the PC2\_ or PC1\_ components must be adequately shielded from the ingress of road spray / debris and chassis and vehicle power train lubricant. Exposure to dirt, water and grease will have a detrimental effect on the working life of the drive belt and electronics.

Full access to the bearing housing, compressor and gearbox oil fill points and level checkpoints must be considered as well as access for general unit maintenance. The use of removable side panels is advisable.

If the compressed air foam is to discharge through one or both of the side lockers and the vehicle builder is fitting the necessary pipe work and isolating ball valves, those components must have a consistent bore of 38mm up to the hose connector.

To prevent compressed air from being trapped in the pipe work, sealed blank caps **MUST NOT** be used on CAFS discharges.

Direction of rotation of the input drive flange is clockwise, when viewed on the gearbox.

## INSTALLATION AND INITIAL SET-UP FOAMLOGIX 3.3/5.0/6.5

For foam pump installation, please refer to the **FoamLogix Model 3.3/5.0/6.5** Description, Installation and Operation manual, part number 029-0021-68-0, supplied separately.

Optional fitting -

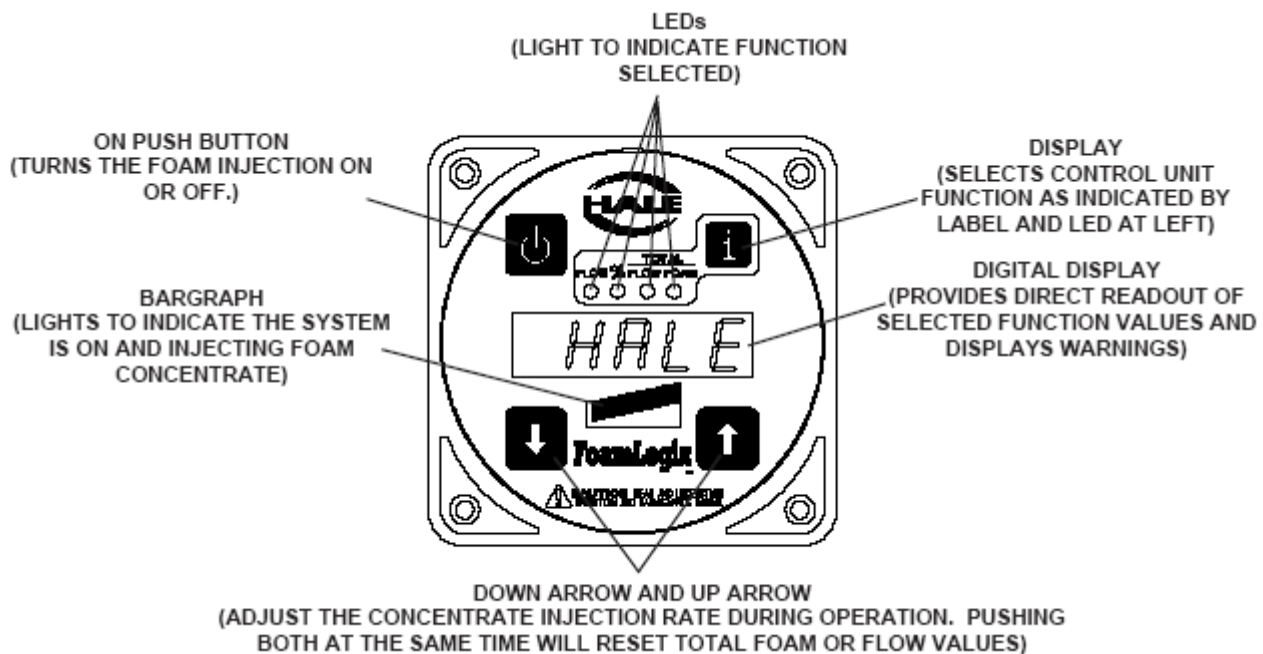
For further information on the MDTII Manual Tank Selector, please see the separate manual supplied, part number 029-0020-40-0.

## OPERATION

**Caution:** PC2\_ or PC1\_ pumps should only be used when working from open water or a tank feed. NEVER USE CAFS WITH A PRESSURE FEED INTO THE EYE OF THE PUMP. Problems will occur with the water / air pressure ratio, should pressurised (hydrant) water supply be applied directly to the suction tube. Hydrant supply may only be used to maintain the water level in the vehicle tank.

**Minimum idle speed:** To prevent unnecessary operation of the pump priming system, maintain an idle speed of 900-1000rpm.

### FoamLogix Control Panel Functions



### Commissioning / Start-Up Procedure

1. Check that all the necessary connections have been correctly made.
2. Ensure that the compressor, pump gearbox and bearing housing are filled with the correct oil type and quantity.
3. Run the water pump at 2-3 bar with compressor engaged.
4. Run the compressor for 30 seconds to allow oil to circulate.
5. Stop unit and check compressor oil level – top up if necessary.
6. Turn the bypass valve on the FoamLogix to bypass and provide a suitable receptacle to collect the foam, agent.
7. Ensure that there is sufficient foam agent in the tank(s). For **FoamLogix 3.3/5.0/6.5** select tank **A**

8. Select simulated flow on the FoamLogix by pressing both up ↑ & down ↓ at the same time.
9. Press the **RED on** button, and the pump will prime itself. The pump will run for 30 seconds or until prime is achieved. If no prime is made, the display will show “no pr”. Repeat this step once more to attempt to prime the pump.  
”no Pr” = No prime display



If priming is not achieved after several attempts check the foam supply is connected and available to the pump. Also use the Fault Finding chart on page 44.

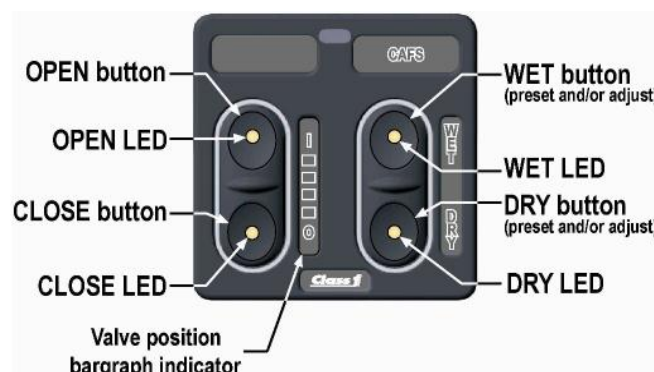
10. **For 3.3/5.0/6.5 FoamLogix**, select tank **B** and repeat the priming procedure for that tank.
11. When prime is achieved, deselect simulated flow by pressing both up ↑ & down ↓ at the same time.
12. Return the bypass valve to the inject position.  
The unit is now ready to run.

### Calibration of FoamLogix

The FoamLogix package as supplied is factory tested and calibrated and should not require further attention. However, should any calibration issue arise, please refer to the appropriate **FoamLogix Model** Description, Installation and Operation manual.

### Smart Switch operation

The CAFS Smart Switch Panel is the primary component of the CAFS with compressor air-inject system. The Smart Switch Panel allows monitoring and control of the consistency of the discharged CAFS foam.



## **WET and DRY buttons**

The WET (or DRY) button is used to position the air ratio control valve at the preset position for the desired CAFS consistency. The WET button will open the valve to its WET preset position, and the DRY button will close the valve to its DRY preset position.

The Smart Switch Panel will only open or close the valve within the operating range dictated by the preset WET and DRY limits calibrated by the factory. The valve position bargraph indicator will display one (1) bar on the bottom when the valve is positioned at the extreme DRY position and all six (6) bars when the valve is positioned at the extreme WET position. No valve movement beyond the WET/DRY limits is permitted. The system is only operational when the compressor is engaged and the FoamLogix is turned on.

## **WET and DRY LEDs**

The WET led flashes when the WET button is pressed and the valve is in transit to the WET preset position. The WET LED lights steady when the valve is set to the preset WET position. The DRY led flashes when the DRY button is pressed and the valve is in transit to the DRY preset position. The DRY LED lights steady when the valve is set to the preset DRY position. If the Compressor is engaged, pressing either the WET or DRY button will start the FoamLogix and send the Air Ratio Control valve to its respective pre-set.

Note: the Air Ratio Control Valve can only be controlled when in CAFS mode.

## **Configure the WET and DRY presets**

The operator can set the WET and DRY presets for desired CAFS consistency. Run the water pump and select CAFS, open the branch nozzles.

### **Configure the WET preset**

Press and hold the WET and DRY buttons simultaneously until the WET and DRY LEDs and backlighting begin flashing (approximately three seconds). Release the buttons.

Use the OPEN and CLOSE buttons to position the valve for the desired wet CAFS consistency.

Press and hold the WET button until the LEDs and backlighting stop flashing (approximately two seconds).

The WET preset has been stored and the SPS panel is operating normally.

### **Configure the DRY preset**

Press and hold the WET and DRY buttons simultaneously until the WET and DRY LEDs and backlighting begin flashing (approximately three seconds). Release the buttons.

Use the OPEN and CLOSE buttons to position the valve for the desired dry CAFS consistency.

Press and hold the DRY button until the LEDs and backlighting stop flashing (approximately two seconds).

The DRY preset has been stored and the SPS panel is operating normally.

## **OPEN and CLOSE buttons**

The OPEN (or CLOSE) button is used to position the valve at any point between the open and closed preset positions. When the OPEN (or CLOSED) button is pressed the WET (or DRY) LEDs will be turned OFF.

## **OPEN and CLOSE LEDs**

The OPEN (or CLOSE) LED will light while the OPEN (or CLOSE) button is pressed. These LEDs will normally be off.

### Valve position bargraph indicator (LEDs)

The valve position bargraph indicates the relative position of the valve in reference to the WET (open) and DRY (closed) presets. Fully WET (open) will light all six (6) bars and fully DRY (closed) will light only the bottom bar.

Note: turning off the FoamLogix or disengaging the compressor will send the Air Ratio Control valve to the extreme WET position.

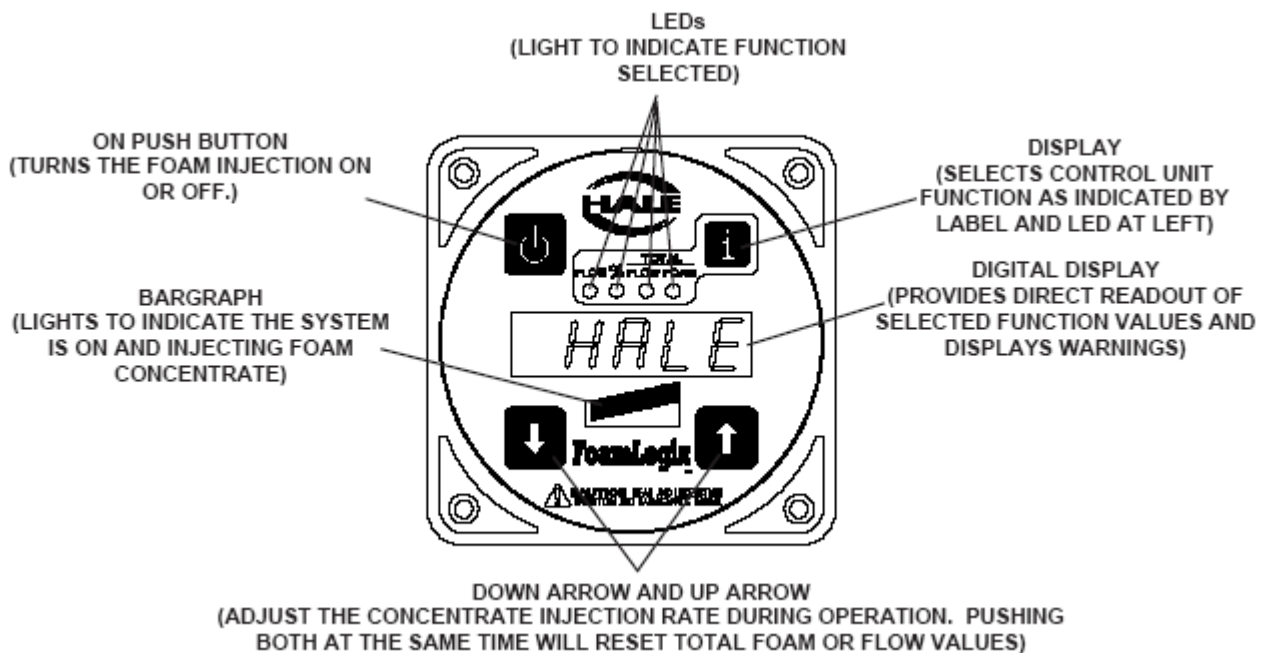
### Operating the PC2\_ or PC1\_ from a Vehicle Water Source

1. Connect a suitable delivery hose and branch to the CAFS discharge.  $\phi 38$  to  $\phi 45$ mm diameter lay flat hose is suitable for delivering compressed air foam.
2. Nozzle -  $\phi 25$  to  $\phi 38$ mm smooth bore is suitable. The  $\phi 25$  smooth bore nozzle is best suited for normal fire attack action. While the  $\phi 38$ mm smooth bore nozzle is best suited for dry foam.

**Note:** Superior foam quality is produced using a smooth bore nozzle and a delivery system with the least amount of valves and sharp bends. However, the scrubbing action of the foam on the hose wall tends to improve the foam quality.



## FoamLogix Control Panel



## Engaging PTO & Priming Main Pump

1. To ensure a clean pump prime and delivery when running from the tank, leave the pump wet, or if the pump is drained, run the pump at idle until a vacuum of approximately -0.5 bar is achieved and then slowly open the tank to pump valve.

## Optional Tank Selection for FoamLogix 3.3/5.0/6.5

For specific detail please refer to the **FoamLogix Model 3.3/5.0/6.5** Description, Installation and Operation manual.


Optional -  
Dual Tank  
Selector  
Three positions –  
**Tank A** – for  
Class A foam  
concentrate  
**Tank B** – for  
Class B foam  
concentrate  
**FLUSH** –  
supplies clean  
water to flush out  
foam concentrate  
from the foam  
strainer and foam

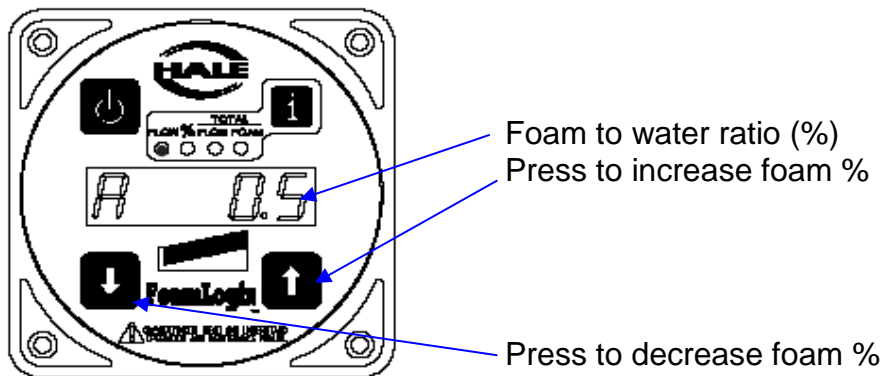


Connection  
Harness

## Discharging Foam / Water Solution Only

(May be operated from open water, tank, or hydrant into pump suction)

1. Engage the main pump PTO, open the tank to pump valve and set the pump at required pressure.
2. Ensure that the foam only option is selected by pressing the bottom of the Foam / CAFS Selector switch, marked with the symbol – 
3. Press the **RED on** button, and choose desired foam % setting to suit the foam agent being used and the operating conditions (factory default is 0.5% for Class A foam and 1% for Class B foam, if configured to run with two foam types).



4. Open CAFS discharge valves to deliver foam agent.

**Note:** the WET / DRY SPS control is only operable when CAFS is selected. The control will default to the wet condition when CAFS is turned off.

**Discharging CAFS** May be operated from open water or tank feed only. DO NOT APPLY HYDRANT PRESSURE TO PUMP SUCTION WHEN OPERATING CAFS.

1. Set the water pump to idle.
2. Select CAFS by pressing the top of the CAFS selector switch – **marked “CAFS”**  
If pump speed is >2400rpm, or compressor pressure is >1.0 bar, the Air Enabled indicator (11) will flash and the compressor will not engage. Reduce speed and/or allow Compressor pressure to relieve so that Compressor will engage, then the light will be on permanently.

**Note:** when the clutch is first engaged it is possible to observe some sparking occurring around the clutch assembly. This small amount of sparking is quite normal and nothing to be concerned about. The lower the engagement speed the less sparking will occur.


3. The operator may select **wet or dry** foam by pressing the wet or dry button on the SPS switch. This will also start the FoamLogix pump and open the air enable valve.
4. The operator may vary the foam condition from WET to DRY by using the **open/close** button on the SPS switch.
5. An indication of wet / dry foam condition is shown by the valve position LED indicator. When selecting DRY Foam increase the foam % level to 1% on the FoamLogix control.

6. Increase pump speed to required operating pressure (4-10 Bar). The system should not be operated outside these pressures. For dry foam the best pressure setting is 6-7 Bar. When air is being injected into the manifold, the air injection indicator will be illuminated (item 13, page 15).

7. Open the delivery valve to discharge compressed air foam solution.

Note: when discharging dry foam at low pump pressure, the possibility of hose kinking is increased and should be considered when deploying hoses.

### Shutting Down

1. Set pump to fast idle.
2. Turn off compressor by setting the Foam / CAFS selector switch to foam position - .
3. Turn off the FoamLogix, press **RED** button.
4. Run water through the CAFS discharge system to flush out the foam agent.
5. Close the CAFS discharge valves.
6. Disengage PTO.
7. If frost is expected, drain the manifold and gearbox oil cooler.

### Overheat Shut down

1. Should the compressor oil temperature reach 105°C, a control panel warning indicator will illuminate. The compressor can sustain 105° C for short periods without damage.
2. If the compressor oil temperature reaches 110° C, the electromagnetic drive clutch will automatically disengage. This will stop the compressed air supply and only foam/water solution will be discharged. The compressor will automatically re-engage when the unit has cooled.
3. The most probable cause of compressor overheating is insufficient cooling water flow.

### Flushing

When returning the apparatus to ready condition after using class B foam, the Hale FoamLogix foam pump **must** be flushed. This is because some Class B foam concentrates deteriorate rapidly. It is recommended that water be run through the pump for two minutes.

**NOTE:** Approved class A foam concentrates do not deteriorate at the rate of class B foam concentrates. Provided that an approved class A foam concentrate is used and the system is used within 10-12 weeks, flushing is not required. After class B foam concentrate has been used, flush the system then select class A.

For detailed flushing instructions, please refer to the **FoamLogix Model 3.3/5.0/6.5** Description, Installation and Operation manual.

## MAINTENANCE SCHEDULE PC2\_/PC1\_

Note: The Godiva Compressor service intervals replace those in the Gardner Denver Compressor manuals

EQUIPMENT	ACTION	PROCEDURE
<b>EVERY 3 MONTHS</b>		
PC1_/PC2_	Check the pump and gearbox oil levels	Pages 20-22
	Do a vacuum test to test for leaks	Page 46
PC2_	Clean the high pressure filter	Page 45
Compressor	Check the oil level and top up if necessary. Run compressor for 15 minutes	Page 24
	Check the drive belt tension and condition.	Page 23
Mixing Manifold	Grease air ratio control ball valve	Page 46
FoamLogix 3.3/5.0/6.5	Check that foam pipe connections are tight	See FoamLogix manual
	Operate the system in bypass to move the concentrate and prevent gelling (if concentrate is left in the system <b>without use</b> for three months)	See FoamLogix manual
<b>EVERY 12 MONTHS</b>		
PC1_/ PC2_	Change the bearing housing oil	Maintenance Manual
Compressor	Change the air filter	Maintenance Manual
	Change the oil and oil filter	Maintenance Manual
Gearbox	Change the gearbox oil	Maintenance Manual
FoamLogix 3.3/5.0/6.5	Inspect wiring/connections, hoses/connections	FoamLogix manual
	Clean the foam strainer	FoamLogix manual
	Verify water flow calibration	FoamLogix manual
	Verify foam feedback calibration	FoamLogix manual
<b>EVERY 24 MONTHS</b>		
PC1_/PC2_	Replace the primer seals	Maintenance Manual
	Replace the priming valve seals and diaphragm	Maintenance Manual
	Test the thermal relief valve	Page 47
Compressor	Replace the oil separator element	Maintenance Manual
<b>EVERY 5 YEARS</b>		
Compressor	Replace the compressor drive belt	Maintenance Manual

**IMPORTANT!** In high usage or abnormal operating conditions, the above procedures may need to be more frequent. The best practise is to flush the system after each use.

## MAINTENANCE OPERATIONS PC2

### Strainer - High Pressure

- 1) Remove strainer / Cap assembly
- 2) With care, remove debris from the strainer by washing.
- 3) The Dowty seal may be reused if free from damage or cuts.
- 4) Re-fit the strainer assembly and secure.



Strainer – high pressure

### Gauges

Do not clean the glass surfaces of the gauges with abrasive or solvent cleaners. These will cloud the glass surface. Use a mild detergent and water.



## MAINTENANCE OPERATIONS PUMP – PC1 OR PC2

### CAFS Mixing Manifold – Greasing Ball Valve

The CAFS Mixing Manifold contains a ball valve as part of the air ratio control system. This ball valve must be maintained by inserting lubricating grease at three monthly intervals to ensure smooth and efficient operation.

Use a marine waterproof grease, e.g “Aquaslip” (supplied by Tetrosyl Ltd., Bury, Lancashire, BL9 6RE. [www.tetrosyl.com](http://www.tetrosyl.com))

The grease is inserted through one or two grease nipples. The first nipple is located on the side of the valve facing the discharge end of the manifold. If a second nipple is fitted, it will be on the other side of the manifold. Connect a suitable grease gun to the nipple and insert grease until a resistance is felt, this indicates that sufficient grease has been inserted.



### Vacuum Test

Place the blanking cap(s) in position on the inlet(s) of the pump and close the delivery valves. Run the pump at 1300-1500 rpm and observe the vacuum/compound needle. When a vacuum of 0.7bar is obtained, stop the pump. This vacuum should be maintained for at least 15 seconds or drop no more 0.07bar in a minute.

If the pump will not hold the vacuum with the blanking caps in position, a leak is present in the pump, and the pressure test detailed below must be carried out to trace it.

Should the pump not reach a vacuum of 0.7bar but will hold a lower pressure, a fault in the priming system is indicated.

Check as follows:

Check each primer drain hole for water leakage. If leakage is found, replace the primer seals and O rings as described in the Maintenance Manual Procedures.

If the pump will not achieve 0.7bar vacuum, and will not hold what it does achieve, there is a leak, and possibly also a fault, in the priming system.

### Pressure Test – carried out without pump running.

This test is to be carried out if the pump will not hold a vacuum with blanking cap(s) in position, and is intended to trace the leaks responsible for the loss of vacuum.

Apply a water pressure of 3.5 - 7.0 bar to the pump and check for leaks. The area causing the leak should be visible, and can be dismantled and rectified. If no leaks are apparent, the leakage must lie between the priming valve and the primer. Points to be checked are:

The inlet seal in the primer end cap

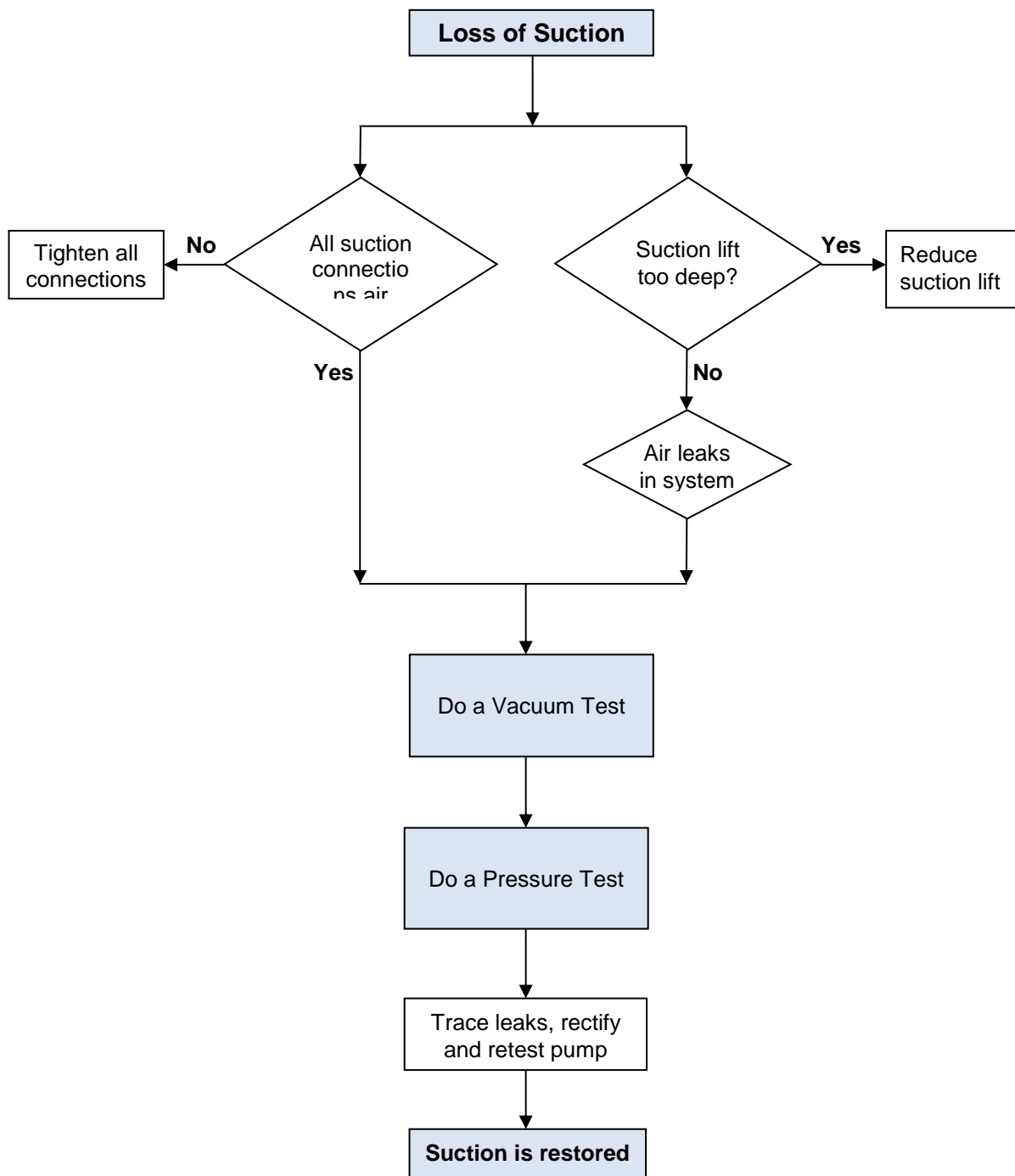
The priming valve diaphragm

### **Thermal Relief Valve (TRV) Test – if option fitted**

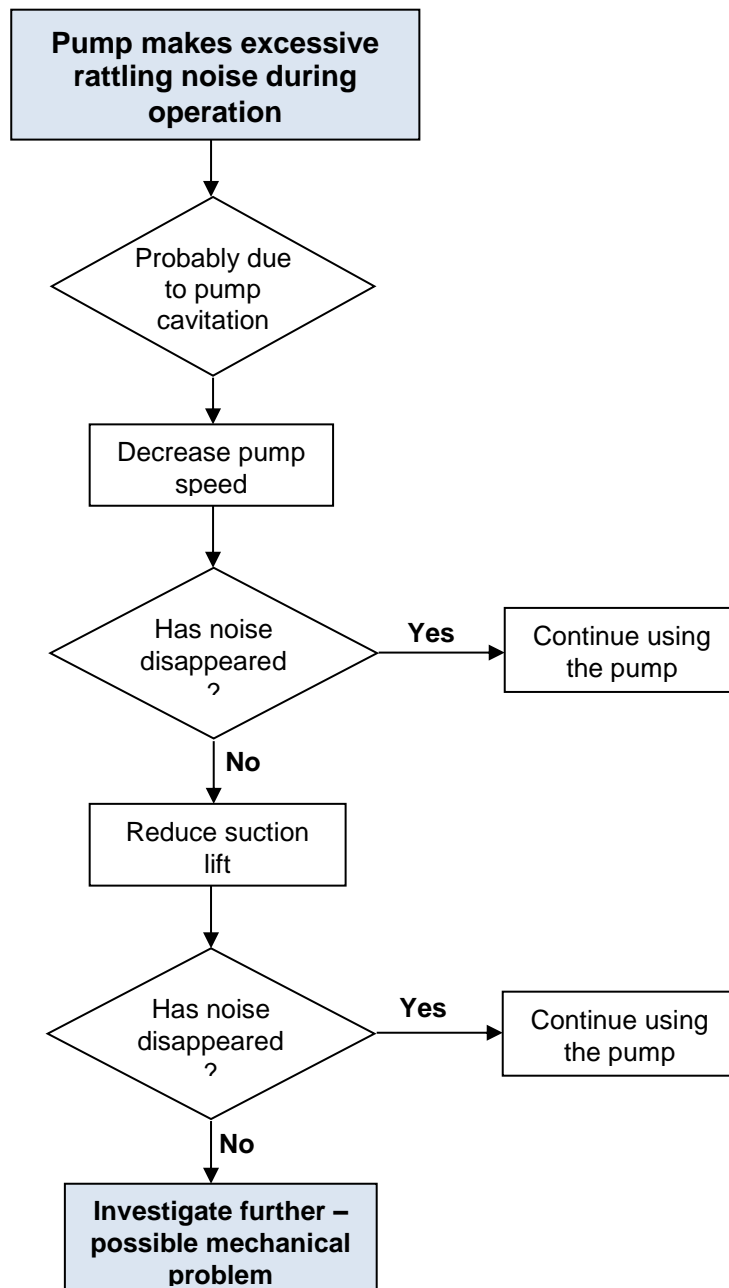
With the pump primed, close all discharges. Run the pump, with high pressure selected, at approximately 2800rpm to permit it to heat up. The TRV should open and discharge water when the pump temperature is in the order of 45 - 55°C with the standard temperature option and 70-75°C with the high temperature option. Observe the valve discharge, if it is open to atmosphere, or feel the discharge pipe become warm if it returns to the vehicle tank. Open a pump discharge valve to permit cool water to enter the pump. The flow from the TRV should now cease.

## FAULT FINDING

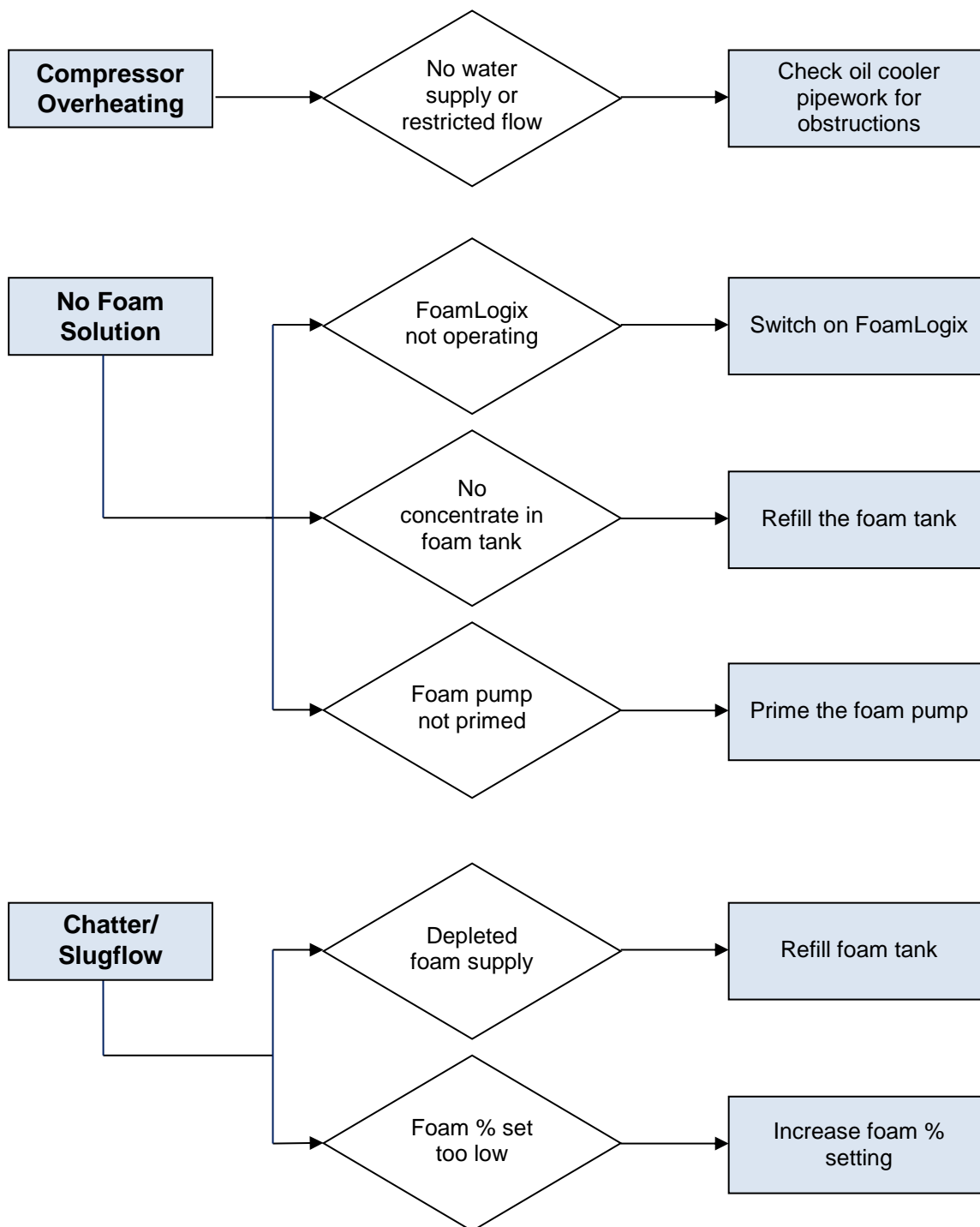
### PUMP OPERATING FAULTS 1 – LOSS OF SUCTION



## PUMP OPERATING FAULTS 2 – EXCESSIVE PUMP NOISE

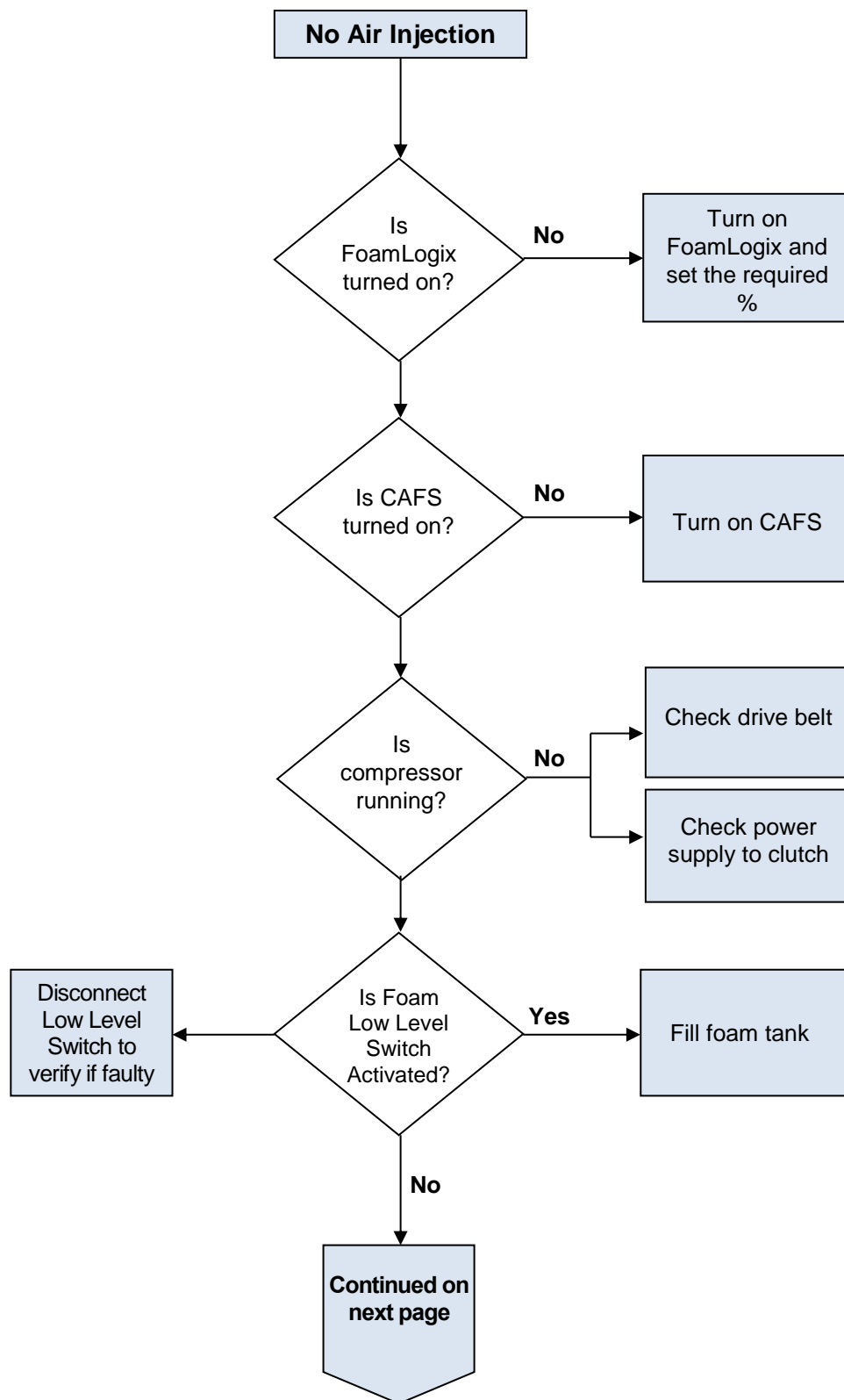


## GENERAL OPERATING FAULTS - CAFS

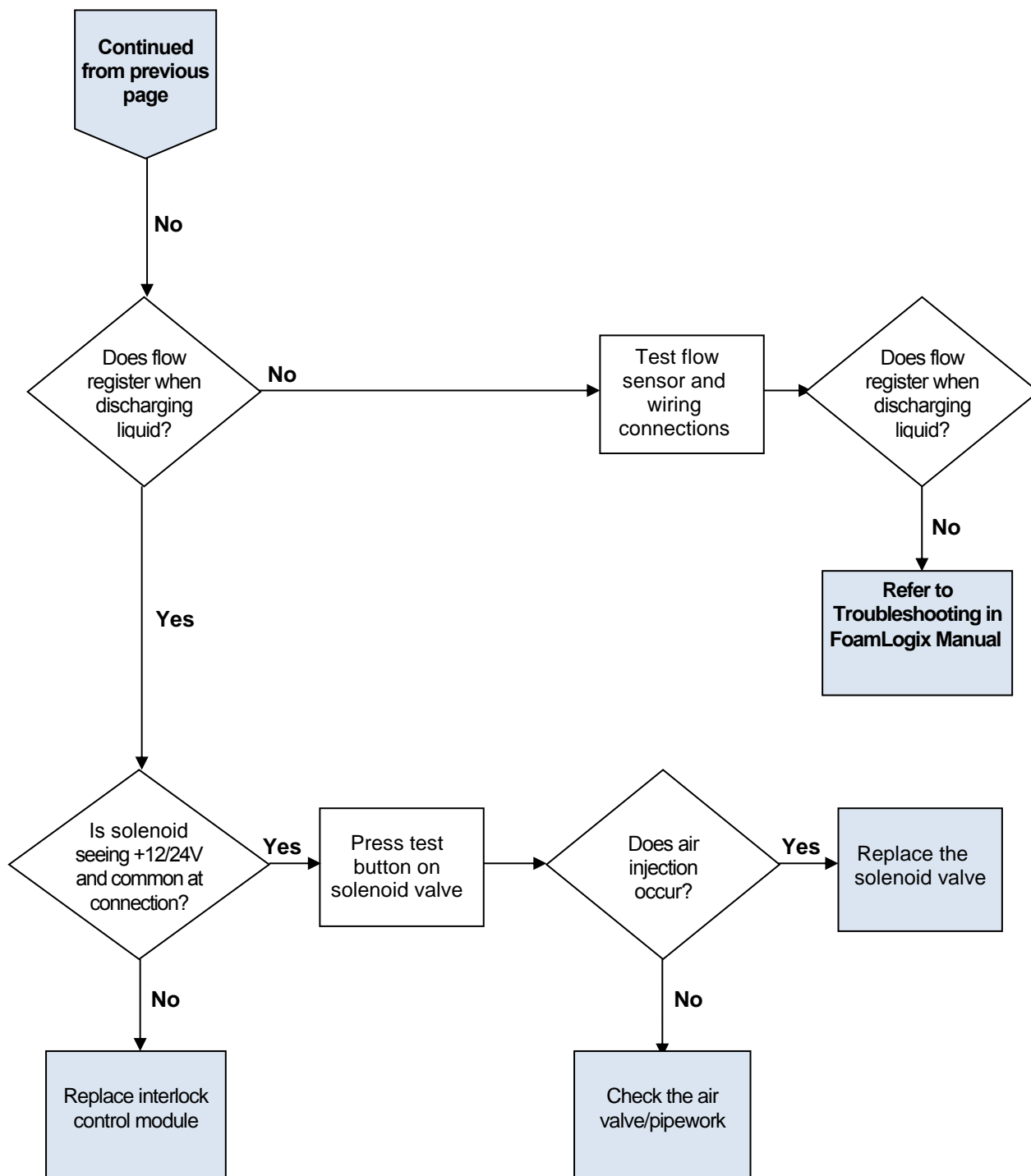




## AIR INJECTION FAULTS



## AIR INJECTION FAULTS continued



Godiva Prima pump illustrated parts list  
Please refer to: **Godiva Ltd.** publications:  
PC2 model – GP/258

Compressor illustrated parts list  
Please refer to:  
**Gardener Denver Enduro 12** manual.

Foamlogix illustrated parts list  
Please refer to:  
**FoamLogix Model 3.3/5.0/6.5** Description, Installation and Operation manual, part number 029-0020-68-0.

## RECOMMENDED SPARES KIT FOR BI-ANNUAL SERVICE

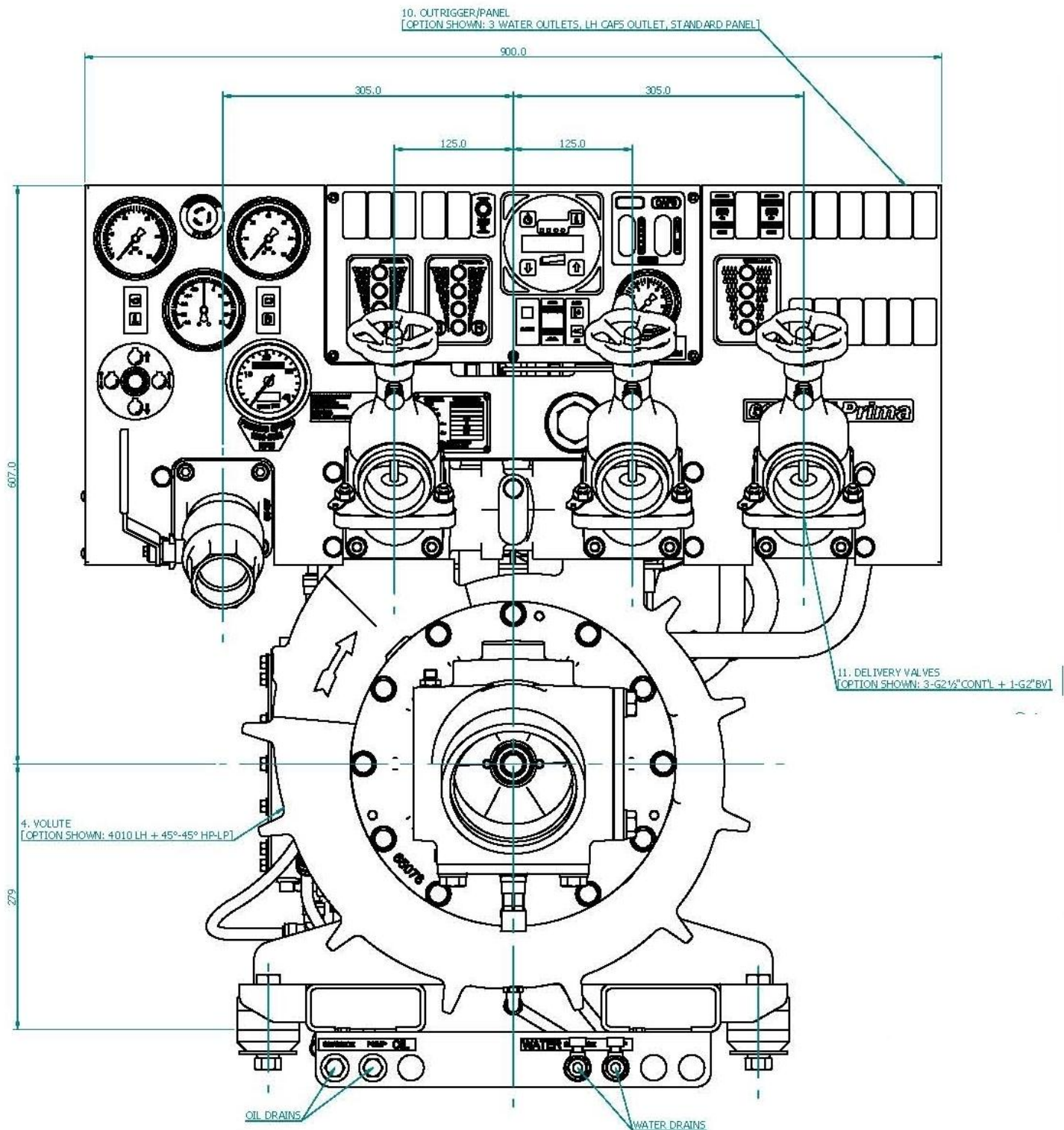
Qty	Item	Unit	Comment
		<b>Compressor</b>	
4	Filter - Oil	70025	
2	Filter - Air	010-0690-00-0	
1	Belt - Drive	61291	
AR	Tensioner assembly - Belt drive	61198/002	
		<b>PC2_ / PC1_</b>	
AR	Strainer - Hi Pressure	60051	Not PC1_ series
4	Washer - Dowty - Oil drain	UFP 2303/08	
2	Washer - Dowty - High Pressure strainer	UFP 2303/15	Common part
2	Washer - Dowty - NRV Inlet	UFP 2303/10	Common part

### Notes

Under normal conditions those items marked AR (As Required) are not deemed to be disposable. However, fluid strainers may be easily damaged during the cleaning process. Please exercise care when handling. It is at the customer's discretion whether said items are carried as 'off the shelf' spares.

## INSTALLATION DRAWINGS – PC2\_ WITH SMARTCAFS200

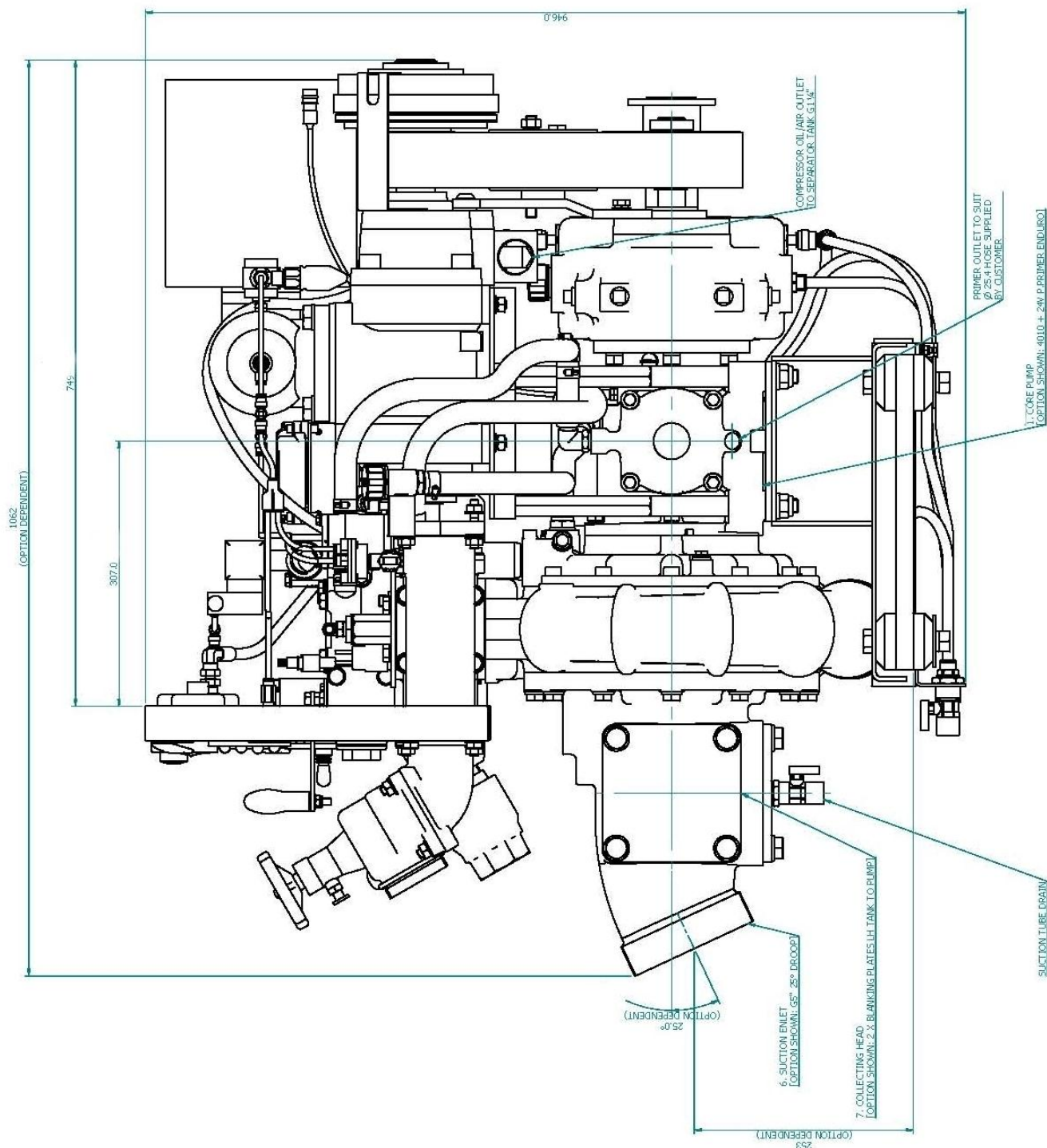
Figure 1A (based on PC2\_4010)



VIEW ON FRONT

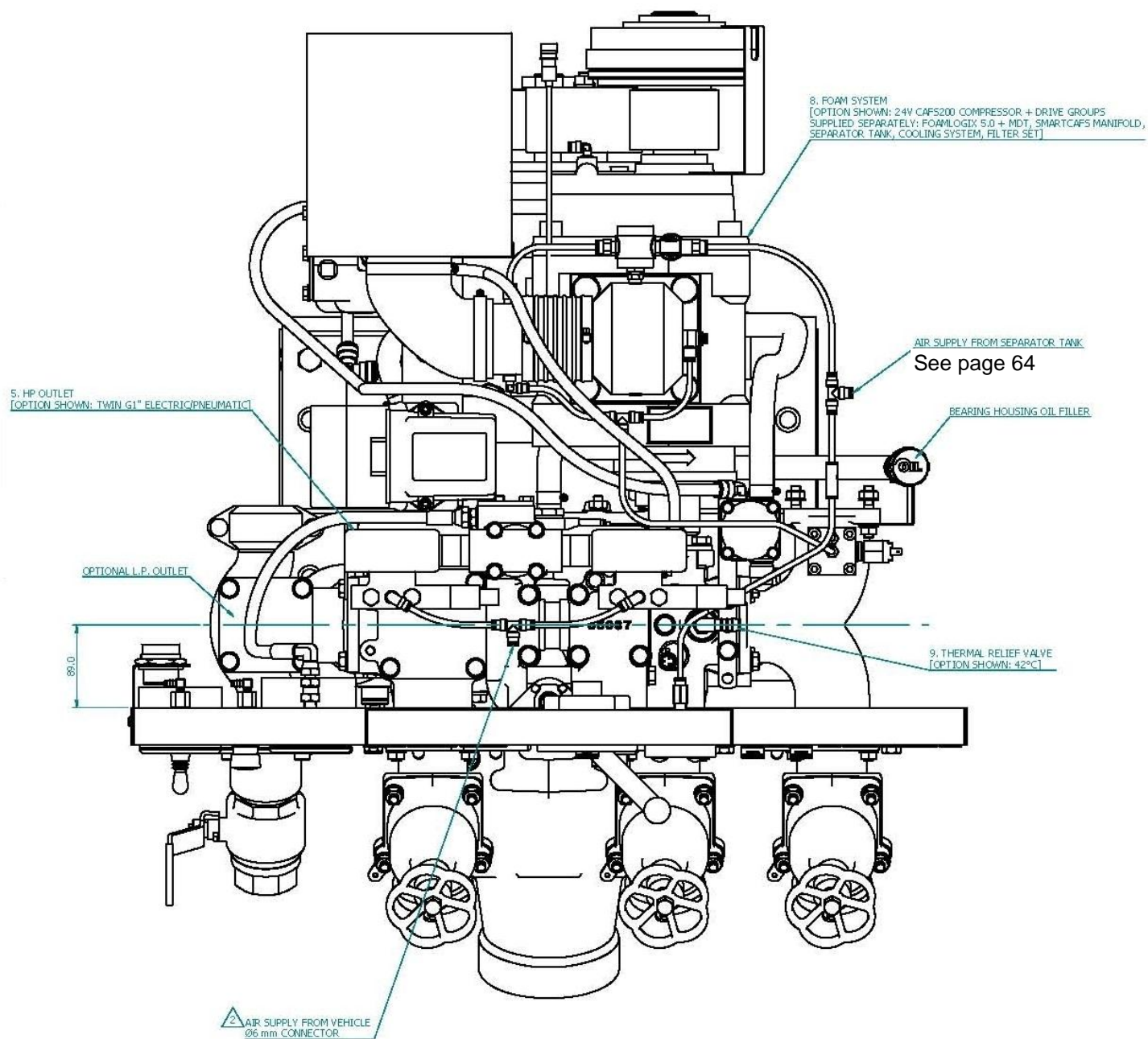


**Figure 1B (based on PC2\_4010)**



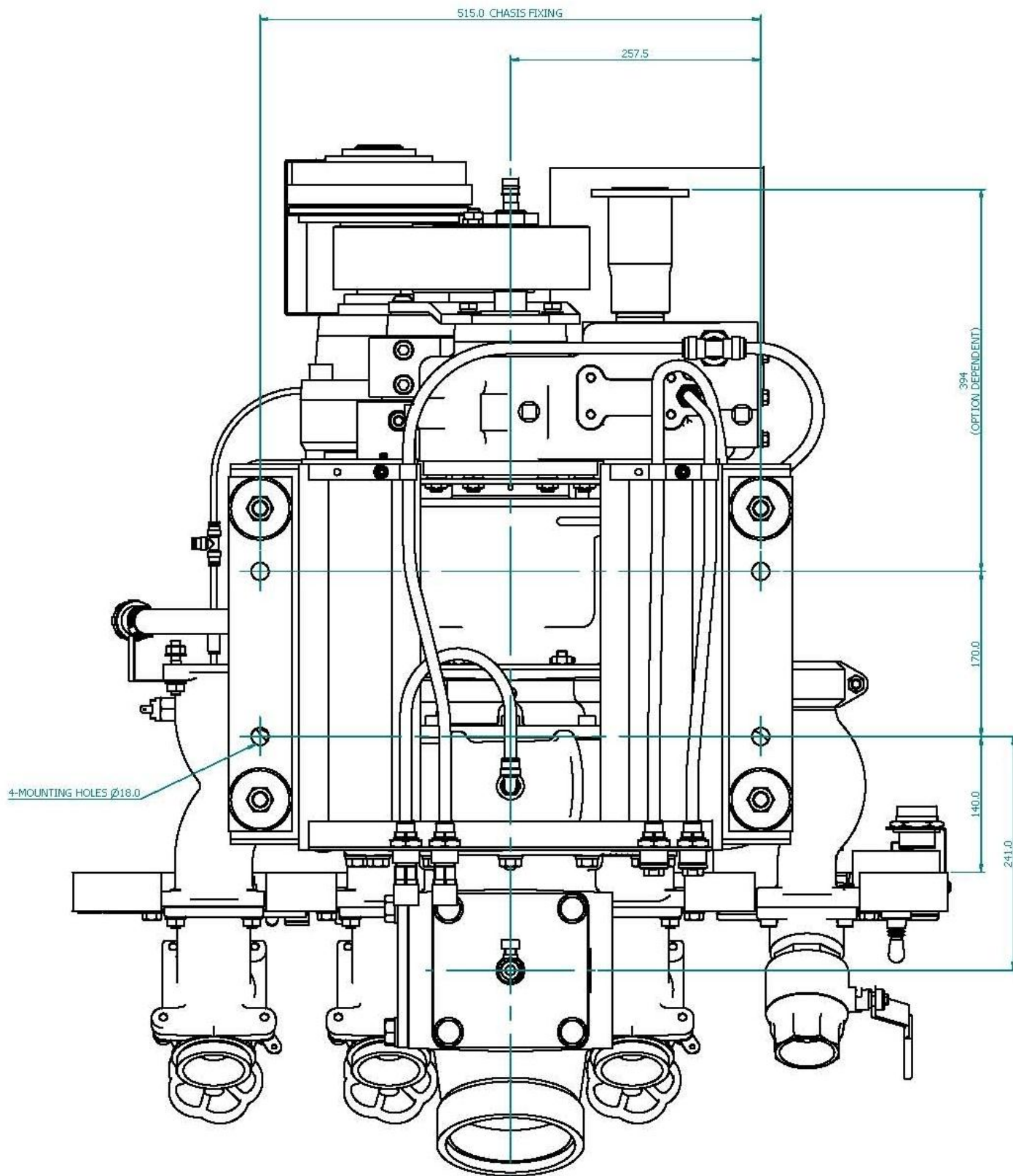
VIEW ON RH SIDE

**Figure 1C (based on PC2\_4010)**



**PLAN VIEW**

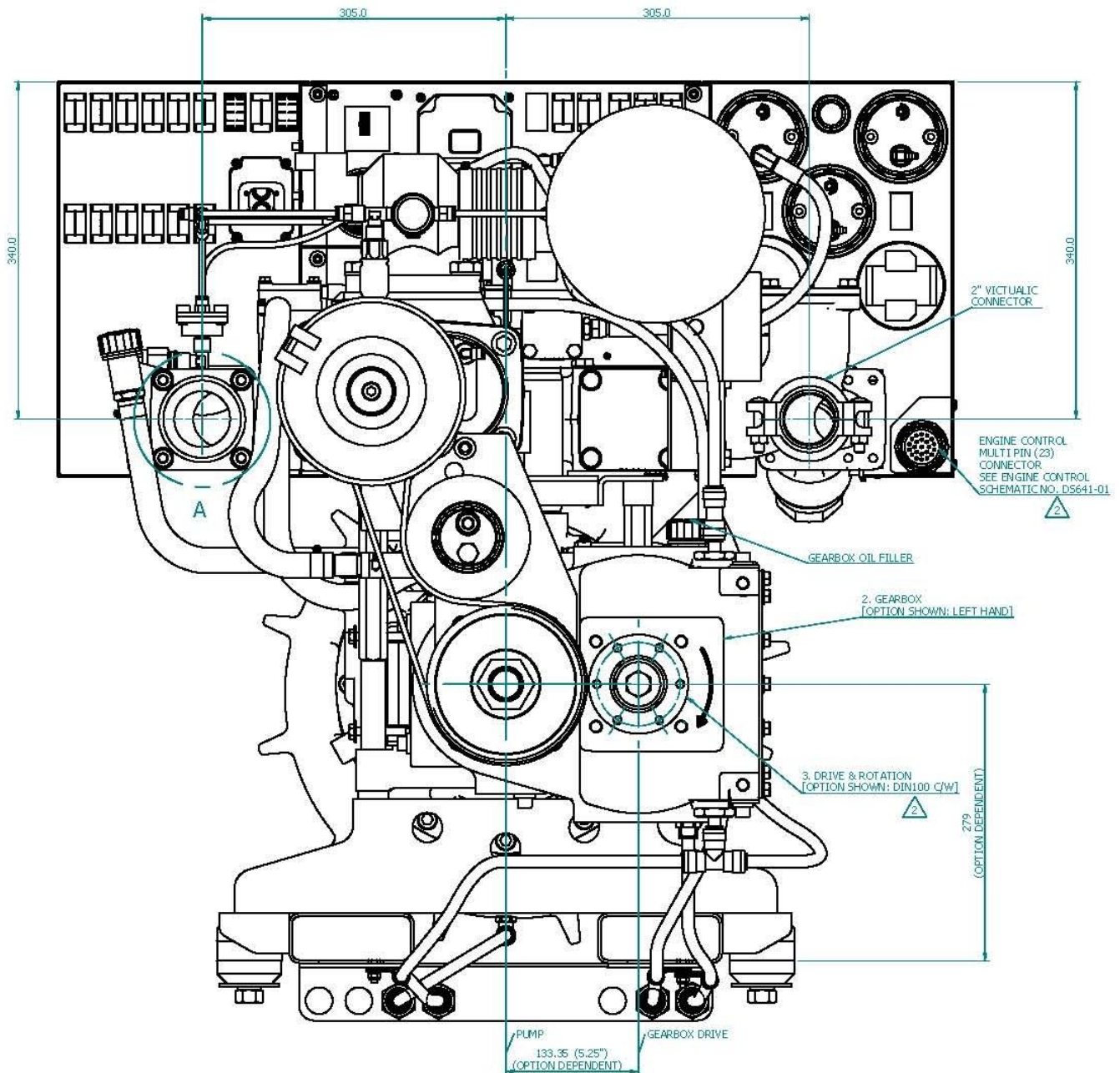
Figure 1D (based on PC2\_4010)



VIEW ON BASE



Figure 1E (based on PC2\_4010)



VIEW ON REAR

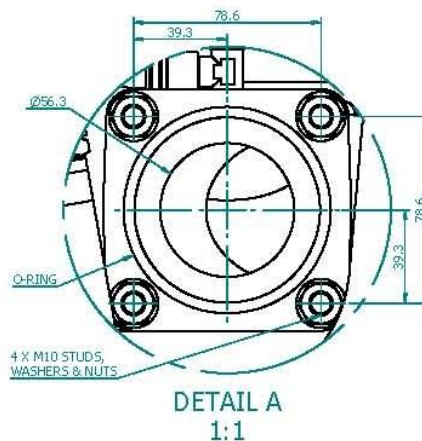
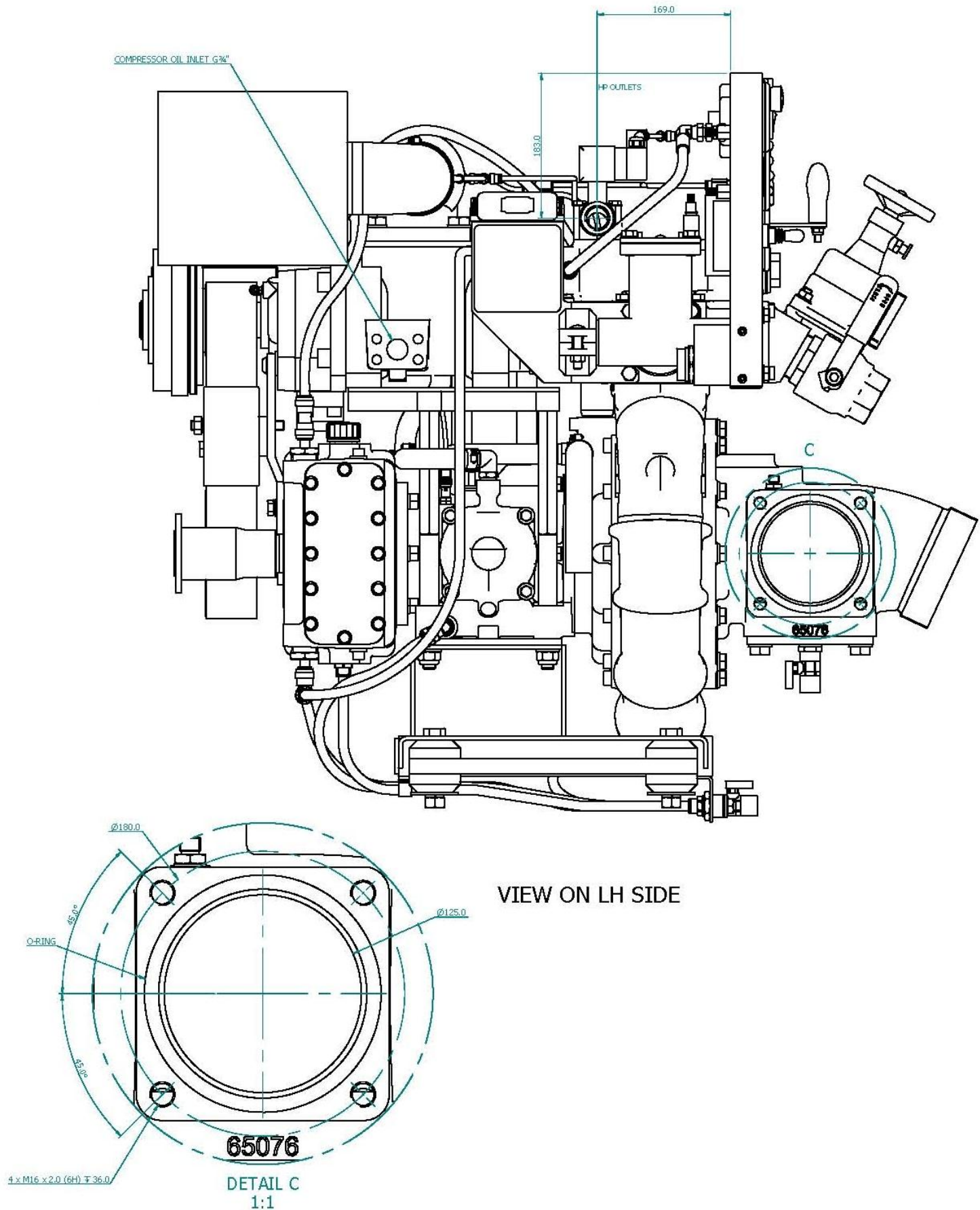


Figure 1F (based on PC2\_4010)





**Figure 2A Manifold**

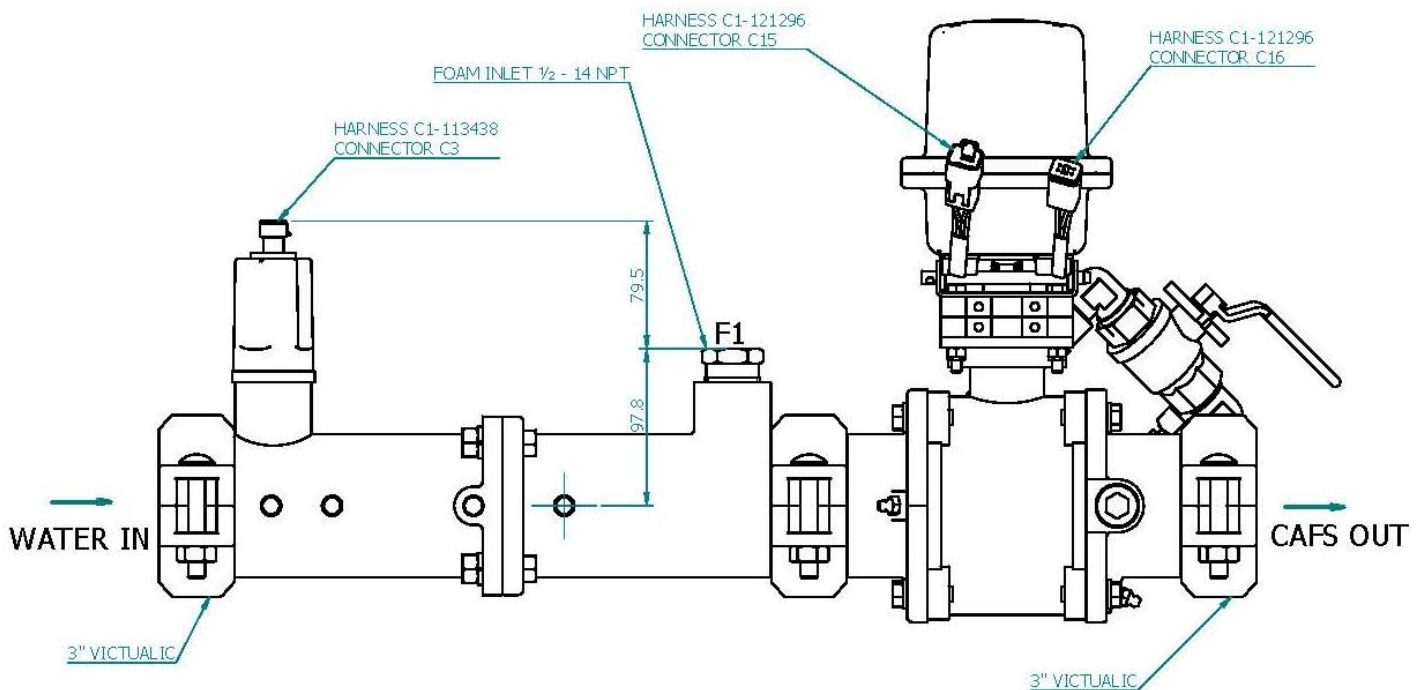
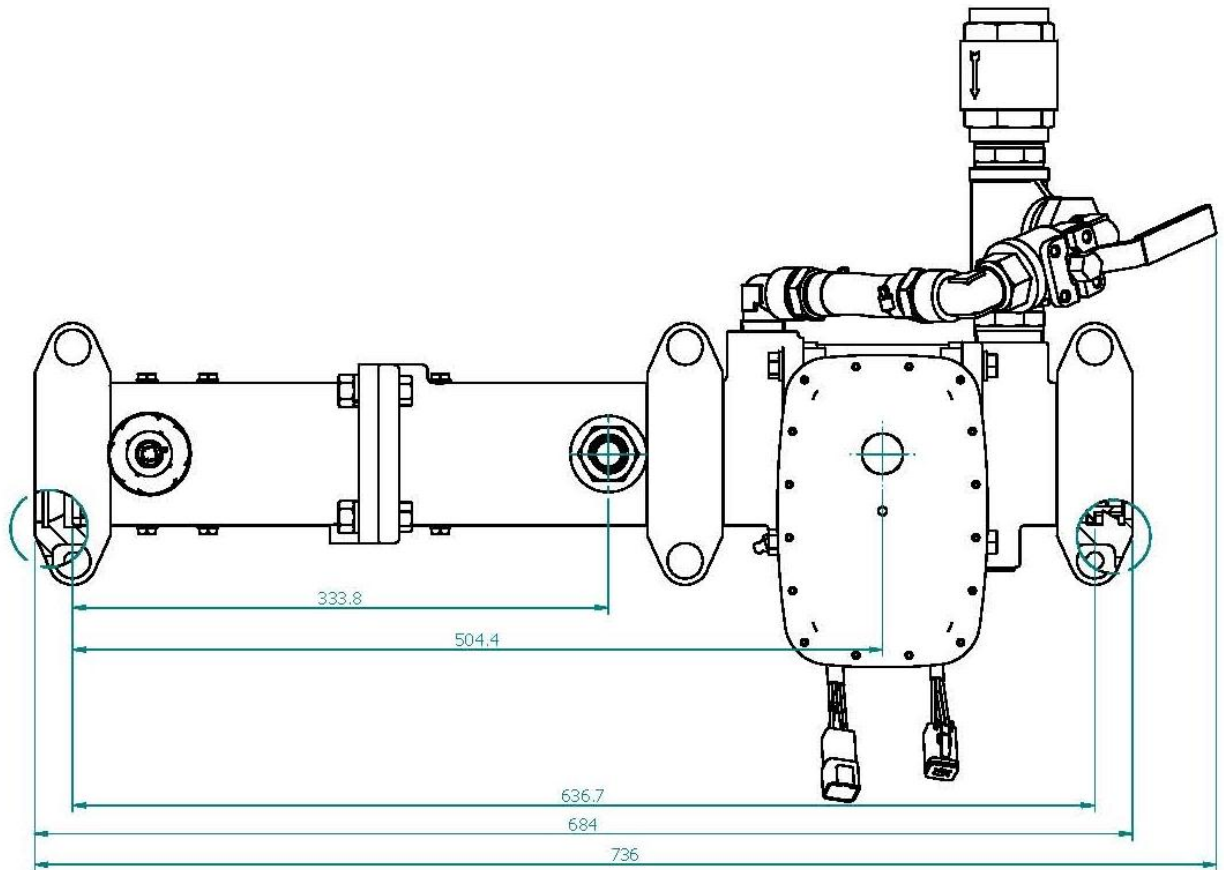
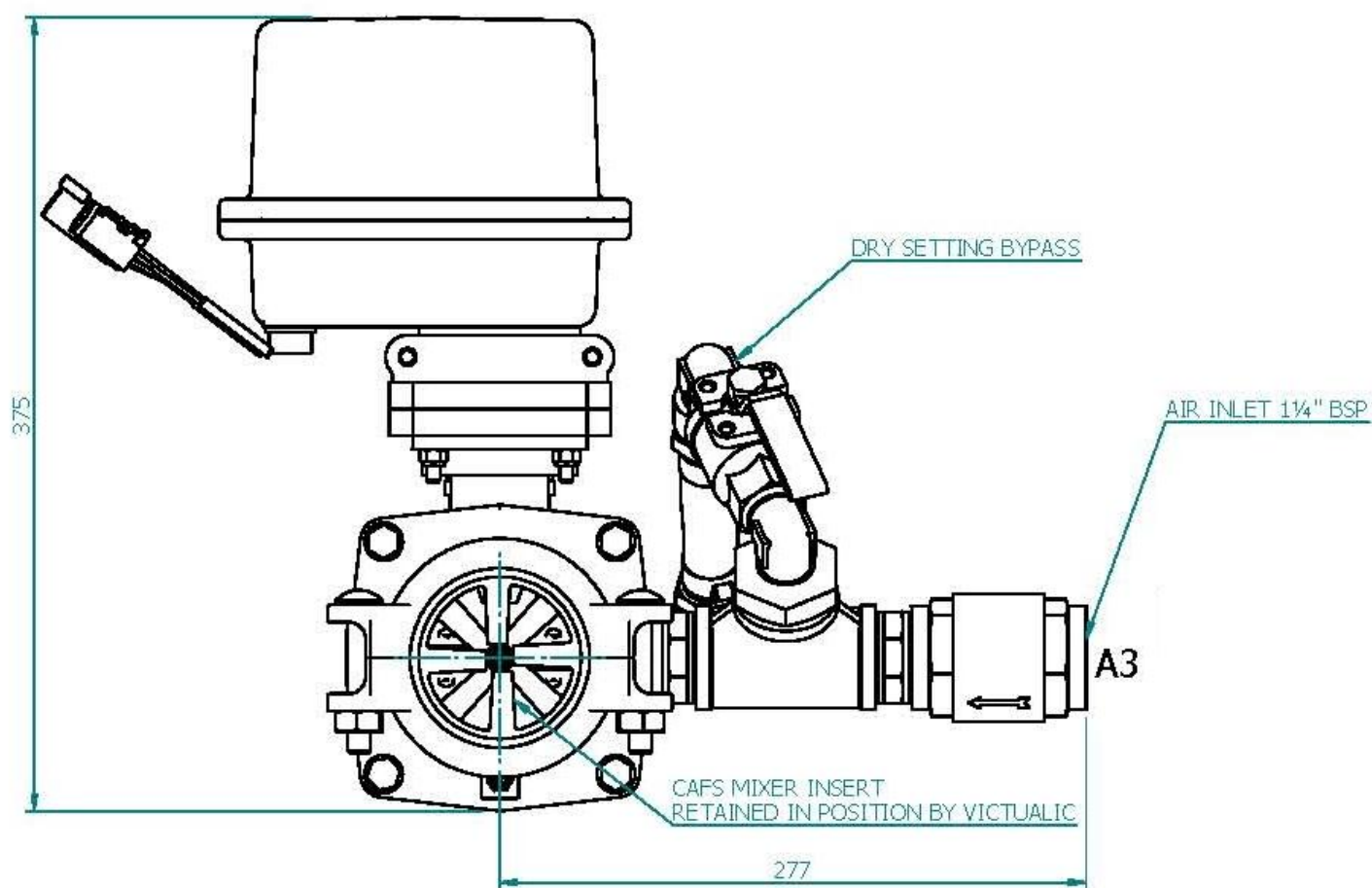
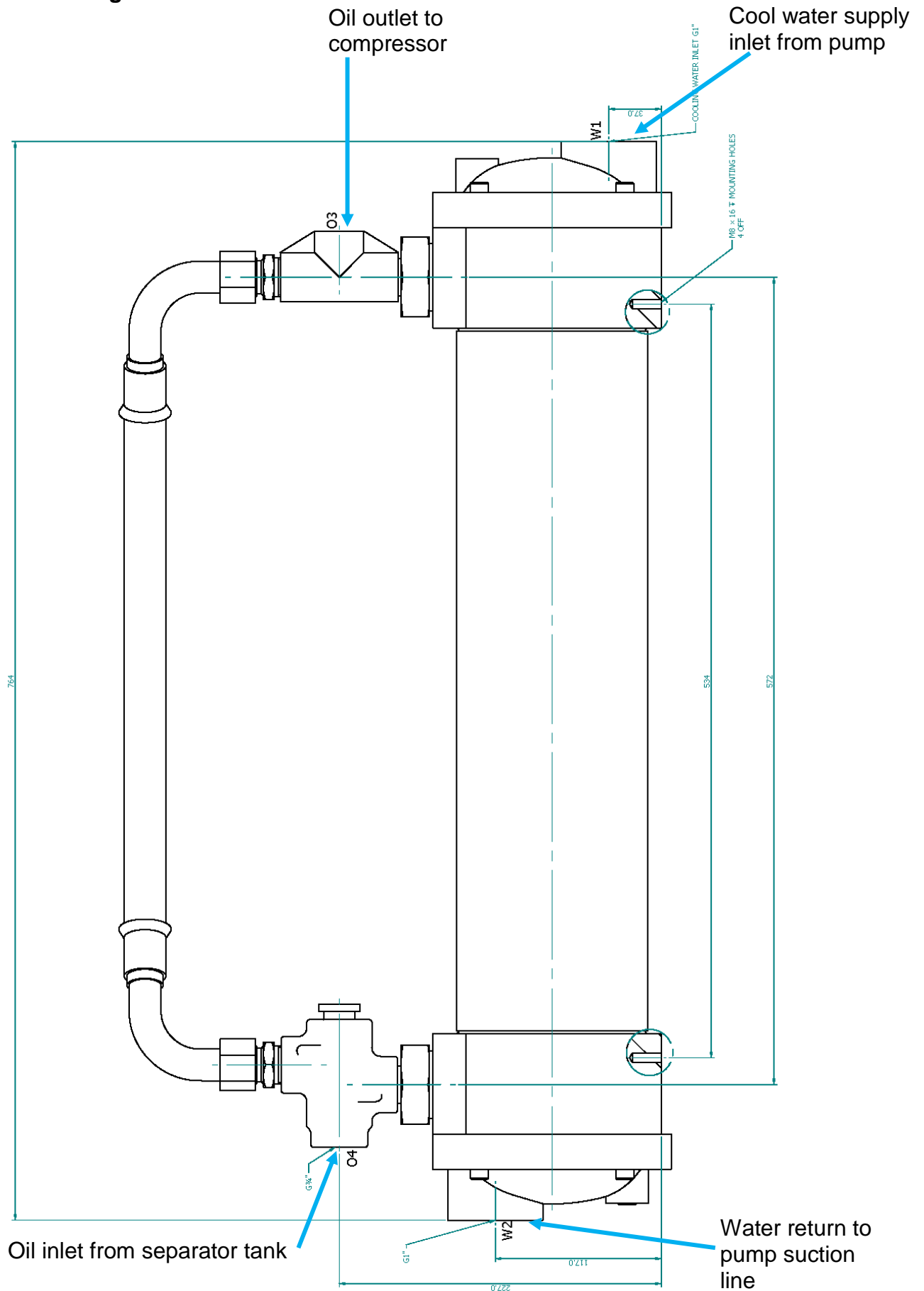


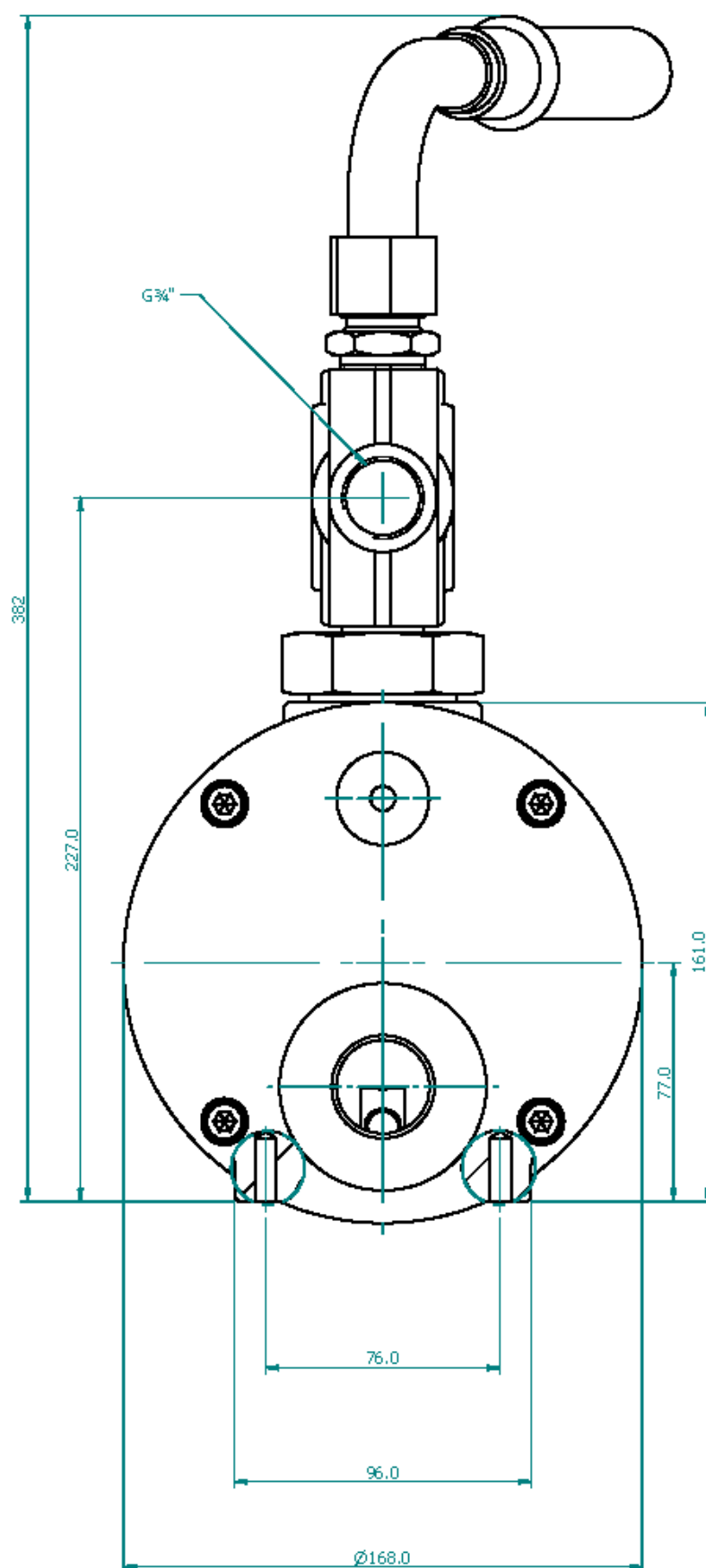
Figure 2B Manifold



**Figure 3A Cooling**



**Figure 3B Cooling**



**Figure 4A Oil Separator**

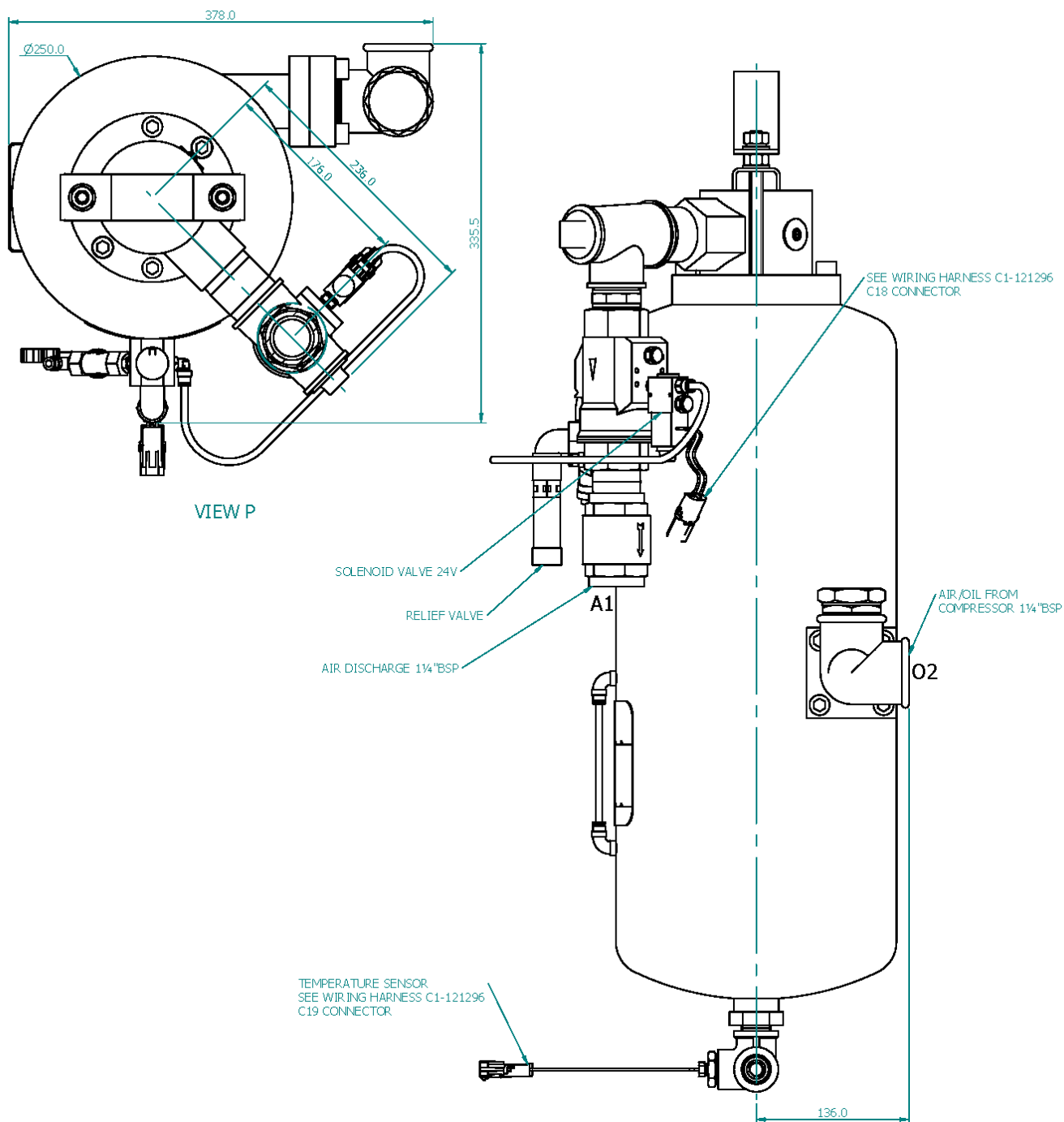
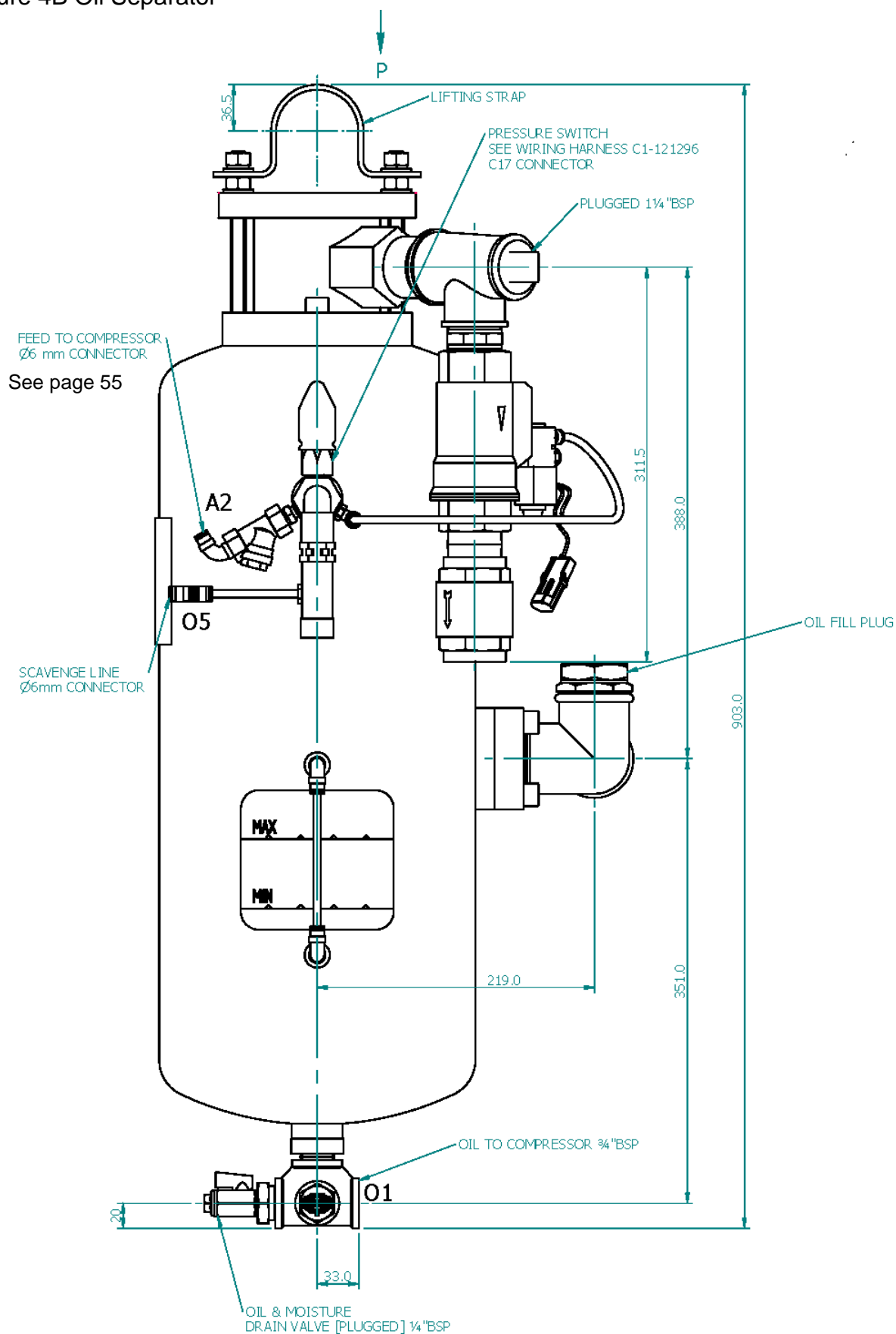
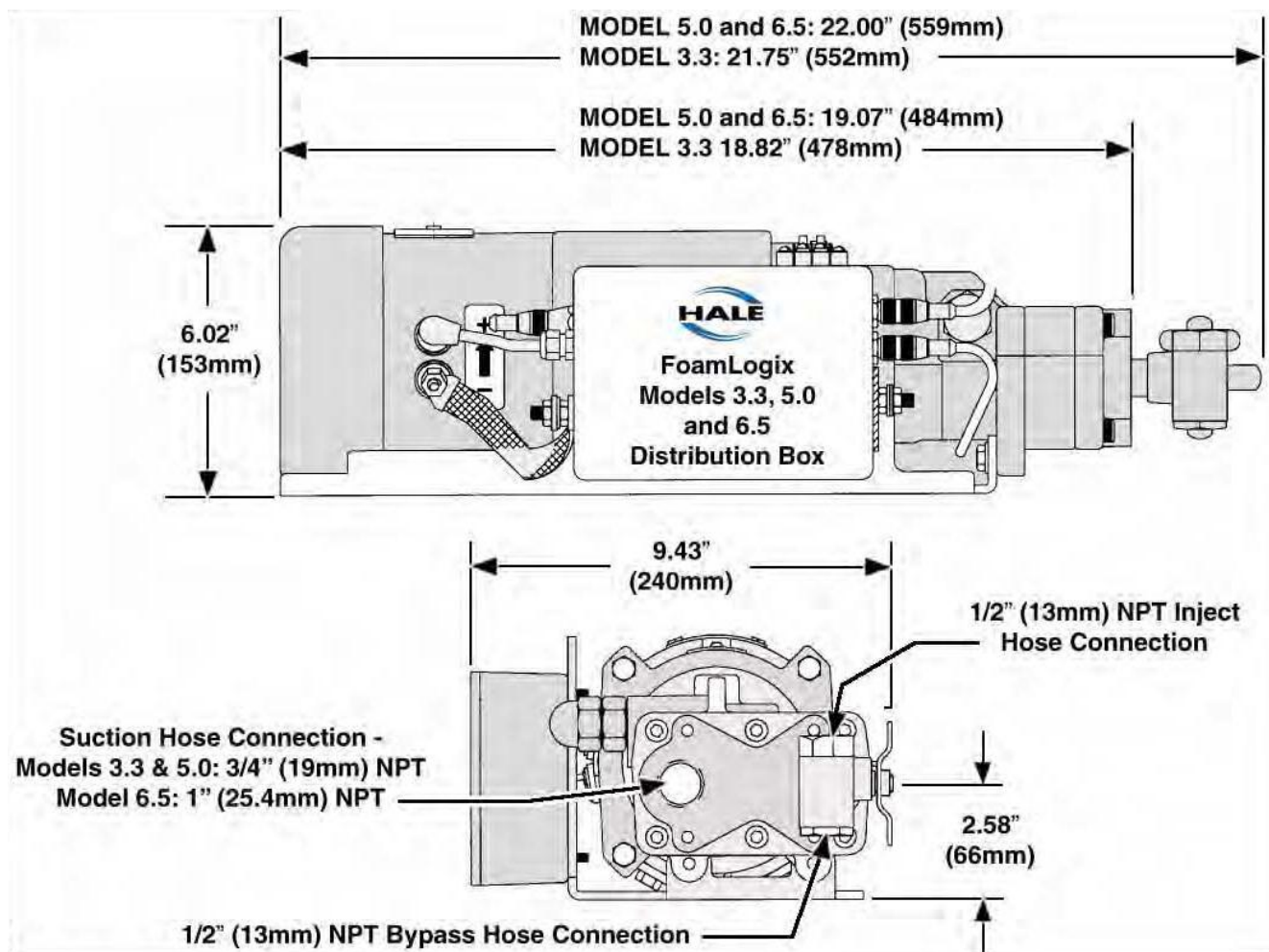




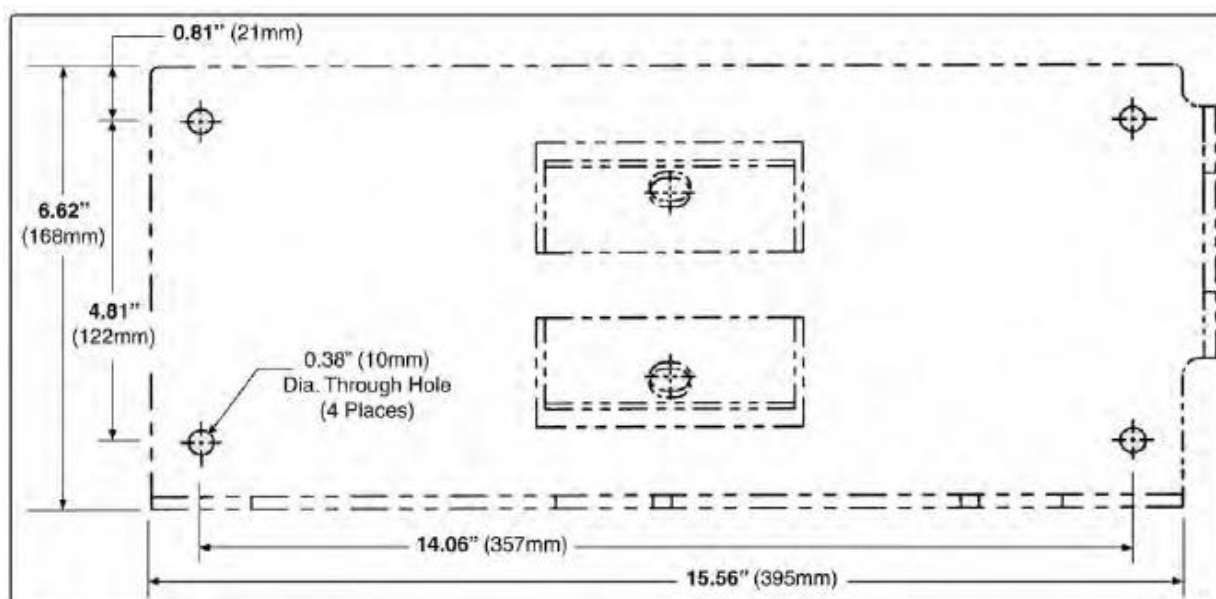
Figure 4B Oil Separator



**Figure 5A FoamLogix Dimensions**



**Fig 5B FoamLogix Baseplate mounting hole locations**



## RECOMMENDED FOAM AGENTS

Class A Foam	Manufacturer	Brand name
US Forestry Service Approved	ANSUL	Silvex Class A Foam Concentrate
	Angus	Forexpan S (0.1% - 1.0%)
	Chubb National Foam	1st Defense Class A Coldwater Foam
	Chubb National Foam	Knock-Down
	Monsanto	Phoscheck WD881
	Chemonics	Fire-Trol Fire Foam 103
	Chemonics	Fire-Trol Fire Foam 104
	3M	Light Water FT-1150
Non U.S. Forestry Service Approved	ChemGuard	Class A Plus
	Unifoam Co Ltd.	UniA 1%
	3M	Light Water SFFF