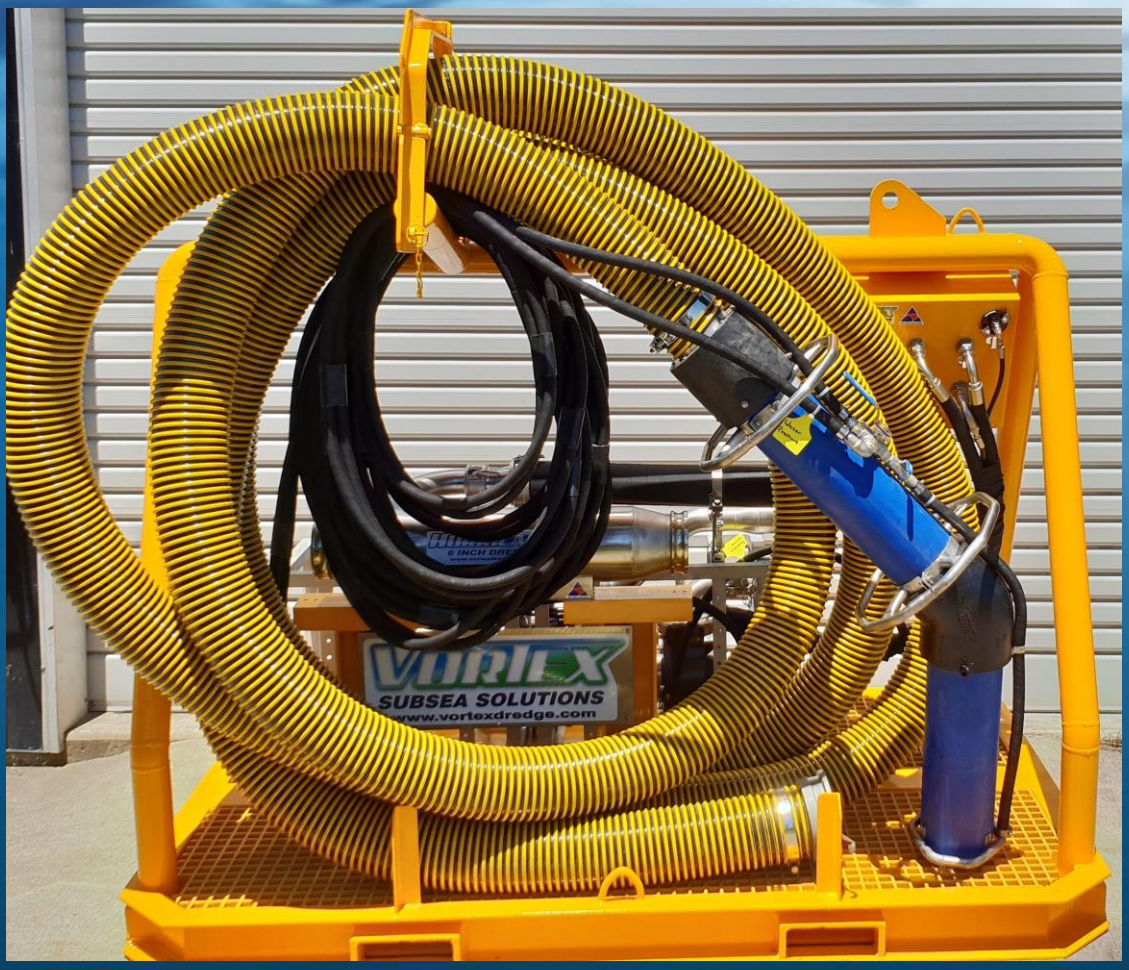
Ashtead Technology



EASYDREDGE diver and ROV dredge skid

VORTEX
SUBSEA SOLUTIONS

VERSION	SECTION	ISSUE DATE	AUTHOR	DESCRIPTION OF UPDATE
1.0		16 May 2019	JG	First Edition

Document name:

EASYDREDGE diver and ROV dredge skid

EASYDREDGE manual version 1.0

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1.INTRODUCTION

EASYDREDGE dredge frame which can dramatically reduce mob costs and bottom times for diver jobs allowing them to deploy onto a truck in one lift and drop in the water ready to go. All other systems we know of require at least two truck loads – then the diver must configure the hoses etc on the seabed.
With this kit everything is ready to go. Just connect hydraulics and put it in the water.
Uses PATENTED Vortex venturi, the most powerful venturi dredge on the market.

- Frame is deployed with suction hose and reversal valve control / jetter hose coiled, connected and ready to go. No need for lowering two loads to seabed. One lift. Easy.
- No need for diver to connect anything on seabed. Huge bottom time savings. Easy.
- Diver simply un clips hose retaining loop, picks up the suction handle, walks over to work site pulling suction and reversal valve / jetter hoses off as they need it and straight to work. Easy.
- Very lightweight suction nozzles. In water weights: 8 inch =10kg, 6 inch = 6kg, 4 inch = 4kg. Less diver fatigue. Easy.
- Diver operated reversal valve and jetter. Diver can control suction power / dredge on - off. Safe and Easy.
- No need to reconfigure hydraulics or water pumps. Same pumps for 3, 4, 6, 8, 10 inch dredge systems. Just dial back topside HPU if less power is needed. Easy.
- One load on truck for freight. Easy.
- Fork slots and crane rigging. Easy.
- Vortex Frame dimensions: 2400 mm long x 1500 mm wide x 2200 mm high(highest point)
- Weight configured with 6 inch dredge and 25mtr long 6 inch hose = 1256 kg
- Frame comes with 4, 6 and 8 inch dredge units as standard kit but can be configured for 3, 10 or 12 inch.
- Inlet suction hose length custom length. 6 inch shown in these pictures with 25mtr long suction hose.
- Exhaust throw length: 6 mtr maximum - but it is best to keep the inlet hose longer due to exhaust back pressure reducing performance of **ALL** venture type dredge units.
- Topside hydraulic feed to butterfly fittings or optional ROV hot stab panel.
- Suction / exhaust hoses configured on deck or sea bed by diver or ROV
- Available suction at inlet Standard is up to 100kpa (Most powerful suction on the market)
- Optional Jetter nozzle water pressure = 70psi plus (4.8 Bar plus)
- Offshore certification for rigging certs to DNVGL-ST-E273, 2.7-3
- Operating depths unrestricted
- Operate pumps in air YES

YOUR SAFETY IS YOUR RESPONSIBILITY. PLEASE ASK IF YOU ARE UNSURE ABOUT ANYTHING.

VORTEX SUBSEA SOLUTIONS

1.INTRODUCTION

Overview

1.1 Reference Documents

See Appendix and references section at the end of this document for certificates and manufacturers data.

1.2 Abbreviations

PPE: Personnel protective equipment

JHA: Job Hazard Analysis

1.3 Contacts

For Technical queries, Comments and Feedback contact Vortex Dredge:

goodinjoe@gmail.com

2. SAFETY

2.1 Overview

All local HSE procedures must be followed. Use of PPE should follow guidelines outlined with handling of potential sample. For example hydraulic pressure should have PPE appropriate to mitigate dangers associated with that operation. Safety glasses should be considered minimum requirement irrespective of potential sample. Your safety is your responsibility. Think and plan ahead accordingly.

2.2 Risk Assessment

Consult with local HSE and installation operators to identify best practice steps needed for safe operations. Identify if the task been done and implement lessons learned. JHA, permitting and toolbox talks should preclude all operations.

2.3 Mechanical

Ensure topside HPU can and does provide enough pressure and flow.

Ensure all fittings and fasteners are secure. Check general condition of tool against images in manual for anything which may indicate potential operational issues.

•Remember, <u>your</u> safety is <u>your</u> responsibility. Think and plan ahead accordingly. If in doubt, please ask.

3. TECHNICAL SPECIFICATIONS

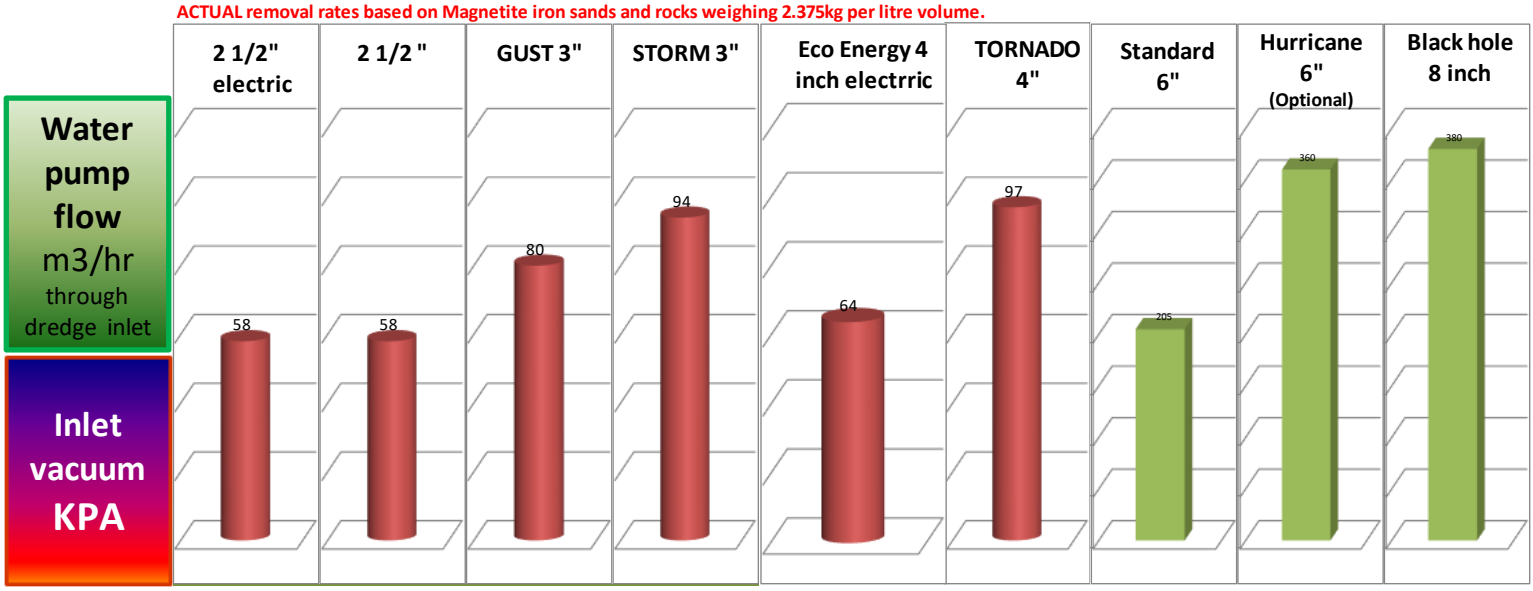
3.1 Performance and removal rates. Based on ACTUAL material moved.

Venturi Performance

WWW.VORTEXDREDGE.COM

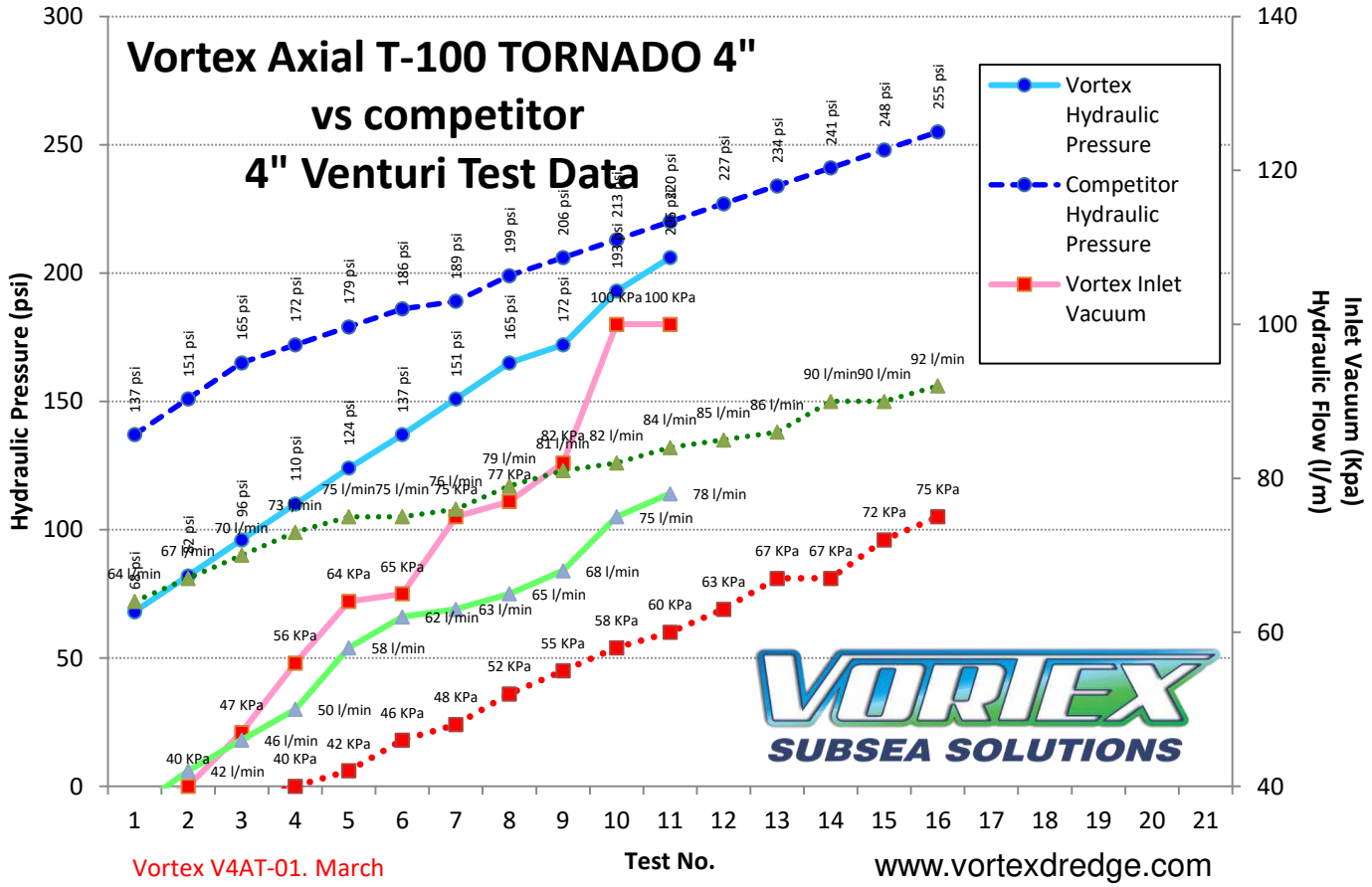
For maximum performance, choose a dredge to suit the Hydraulic Supply

ACTUAL removal rates based on Magnetite iron sands and rocks weighing 2.375kg per litre volume.



	2 1/2" electric	2 1/2 "	GUST 3"	STORM 3"	Eco Energy 4 inch electrric	TORNADO 4"	Standard 6"	Hurricane 6" (Optional)	Black hole 8 inch
Peak inlet Vacuum @ (Min)	58 KPa	58 KPa	80 KPa	94 KPa	64 KPa	97 KPa	64 Kpa	80kpa plus	42kpa plus
Water pump Flow					55 m3/hr	62 m3/hr	205 m3/hr	360 m3/hr	380 m3/hr
Hydraulic Flow (Min)	6.4 amp running	15 litres / min	20 to 40 lpm	40 to 70 lpm	3.7amp running	62 to 85 lpm	100 lpm	180 lpm	180 lpm
Hydraulic Pressure	620 VAC minimum	140 bar	200 bar	200 bar	3kva	151 bar	200 bar	230 bar	230 bar
Removal Rates @ (Min) flow									
ton per hour	6.8 t/hr	6.8 t/hr	7.3 t/hr	25 t/hr	50 t/hr plus	60 t/hr plus	60 to 80 t/hr	120 t/hr plus	146 t/hr plus
cubic metres per hour	4.5 m3/hr	4.5 m3/hr	5 m3/hr	10.5 m3/hr	22 m3/hr plus	27 m3/hr plus	30 m3/hr	5o m3/r plus	62 m3/r plus
Solids by volume	6%	6%	6%	10%	10% plus	15% plus	10 to 12%	TBA	10 to 15%
Horizontal discharge	2 mtr (est)	2 mtr (est)	7 mtr (est)	10 mtr (est)	20 mtr (est)	20 mtr (est)	15 mtr (est)	TBA	TBA
Vertical discharge									

NOTE: Figures stated as of 2018 and subject to change without notice.



3. TECHNICAL SPECIFICATIONS

3.2 Hydraulic Specifications

Topside hydraulic feed to hydraulic panel:

- 1 inch BSPP coupler wing nut (tank return)
- 1inch BSPP Nipple wing nut (Pressure)
- 1inch BSPP Nipple wing nut (case drain)

- Hydraulic flow: 100lpm / (26gpm) minimum using **ONE** pump 150lpm (26 / 40gpm) maximum.

- Hydraulic flow: 150lpm / (40gpm) minimum using **TWO** pumps maximum 250 lpm / (66gpm).

- Hydraulic pressure: 206bar / (3000psi) minimum, 350 bar / (5070psi) maximum.

- Case drain can be run back up tank return line when using two port optional ROV hot stab panel but ensure total return line pressure does NOT exceed 15bar at pump end of lines.

- Operate pumps in air YES

ENSURE HYDRAULIC HOSES ARE ALL BLED BEFORE DIVING.

YOUR SAFETY IS YOUR RESPONSIBILITY. PLEASE ASK IF YOU ARE UNSURE ABOUT ANYTHING.

3. TECHNICAL SPECIFICATIONS

3.3 Hydraulic hose lengths.

When choosing a deck pack for hydraulics there are a few things to consider:
Of UTMOST importance is that the entire hydraulic system is SLOWLY bled of air before sending full flow and pressure into the pumps. This is to avoid over revving the hydraulic motors before they are bled fully. These water pumps can be run in air to make bleeding the hydraulics easier.
They will need to consider pressure drop in hoses when specifying a hydraulic power pack.
They will need a pressure hose , return hose and case drain hose.

For example:
Ensure that the power pack is capable of 3500 or 4000psi as the system will loose pressure through line loss as follows:
Using a 150 mtr long 1 inch internal diameter hydraulic hose running at 4000psi will loose around 140 psi of pressure.
Using a 150 mtr long 3/4 inch internal diameter hydraulic hose running at 4000psi will loose around 435 psi of pressure.

So they MUST run the power pack at a higher pressure than 3000 psi to compensate for this loss.

As far as hoses and joins go, any doubt then just go bigger on the power pack. I have been bitten so many times offshore by QD's and what they are supposed to flow. Larger hydraulic are always best.
Your hydraulic supplier is responsible for ensuring the hoses he gives you are capable of flowing what the gear needs.
Usual story, Just go bigger with the power pack as our dredge can handle it.

3. TECHNICAL SPECIFICATIONS

3.4 Hydraulic connection panel.

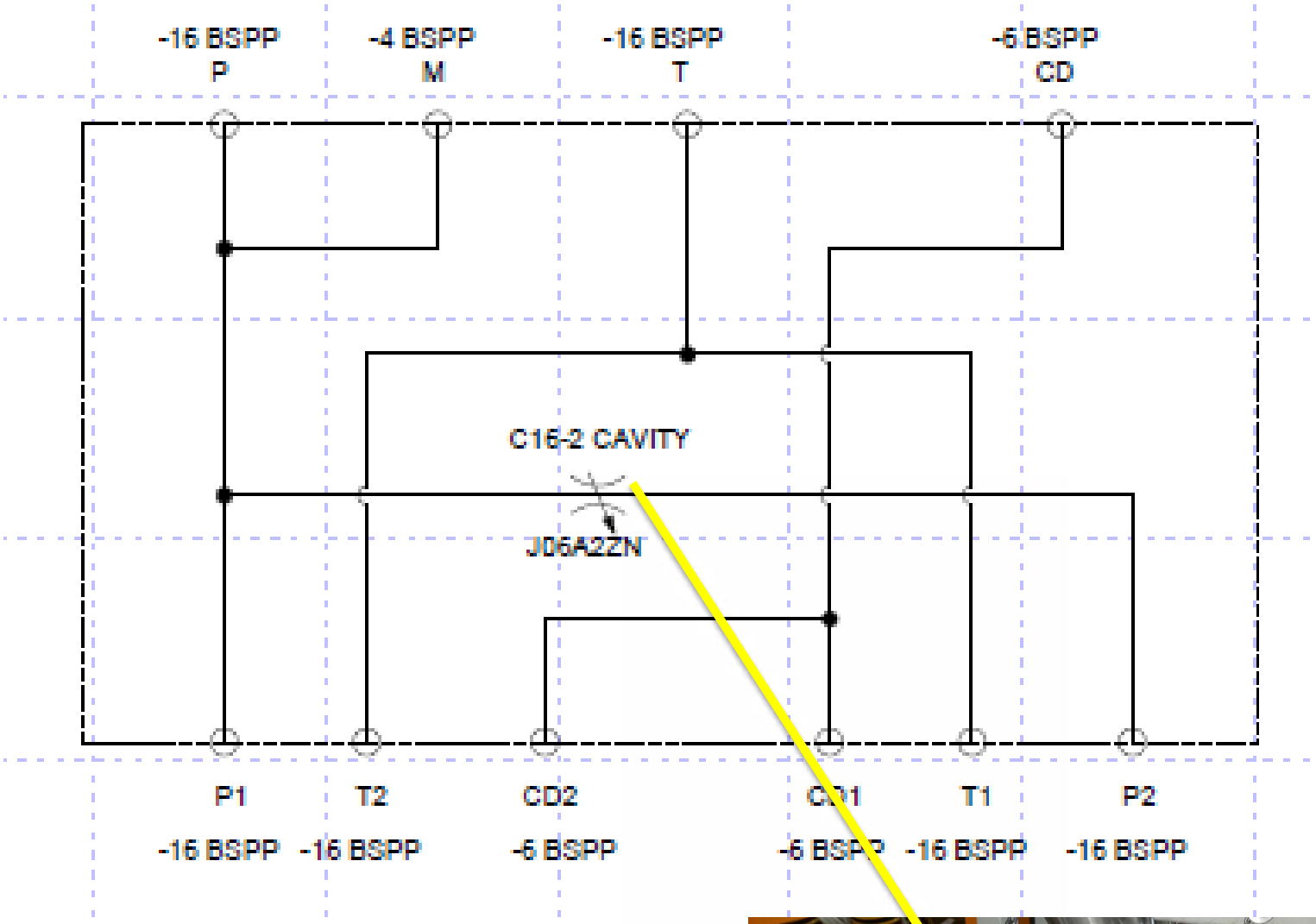
Topside hydraulic feed to hydraulic panel:

- 1 inch BSPP coupler wing nut (tank return)
- 1inch BSPP Nipple wing nut (Pressure)
- 1inch BSPP Nipple wing nut (case drain)
- Hydraulic flow: 100lpm minimum using **ONE** pump / 150lpm maximum. (26 / 40gpm)
- Hydraulic flow: 150lpm minimum using **TWO** pumps / 200lpm maximum (40 / 52gpm)
- Hydraulic pressure: 206bar minimum / 350 bar maximum (3000psi / 5070psi)
- Case drain can be run back up tank return line when using two port optional ROV hot stab panel but ensure total return line pressure does NOT exceed 15bar at pump end of lines.
- Operate pumps in air YES

3. TECHNICAL SPECIFICATIONS

3.5 Hydraulic isolation manifold.

This allows user to isolate the front pump from use and use only the rear pump for situations where only a smaller HPU of 80 to 150lpm (21 to 40gpm) is available and using venturi of 4 inch or smaller. One pump at 80lpm or more is enough to run the 4 inch or smaller. 6 and 8 inch venturi require two pumps at 150lpm (40gpm) or more.
Always use 206bar (3000psi) or more.



Arrow shows isolating flow control valve.
Remove stainless cap and screw clockwise / in to shut off front pump and run on rear pump only. Replace cap after adjustment.
ALWAYS ensure screwed fully counter clockwise / out when running two pumps is required.

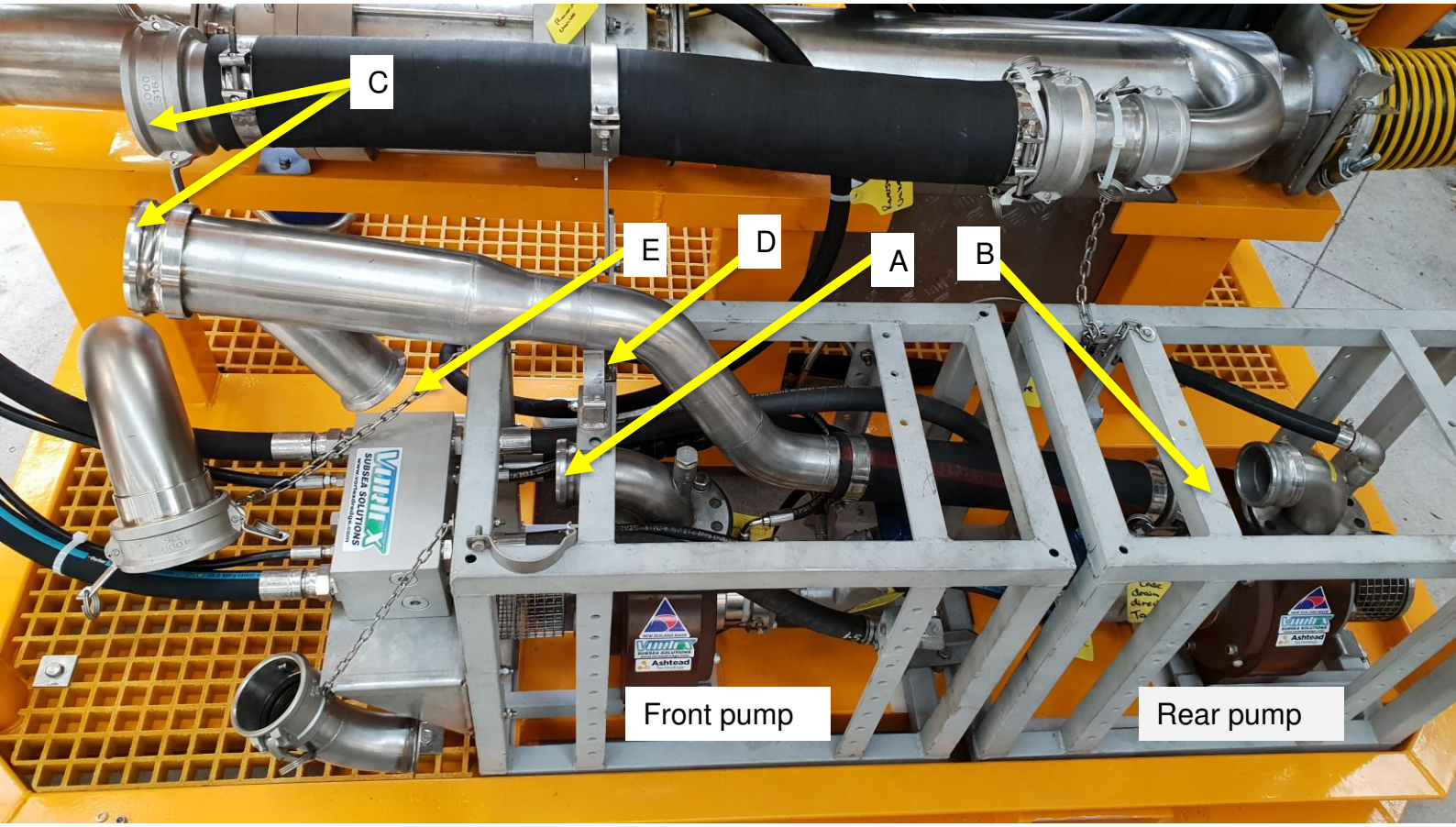
3. TECHNICAL SPECIFICATIONS

3.6 How to configure for single pump use:

This allows user to isolate the front pump from use and use only the rear pump. Remove stainless cap and screw clockwise / in to shut off front pump and run on rear pump only. Replace cap after adjustment.

ALWAYS ensure screwed fully counter clockwise / out when running two pumps is required.

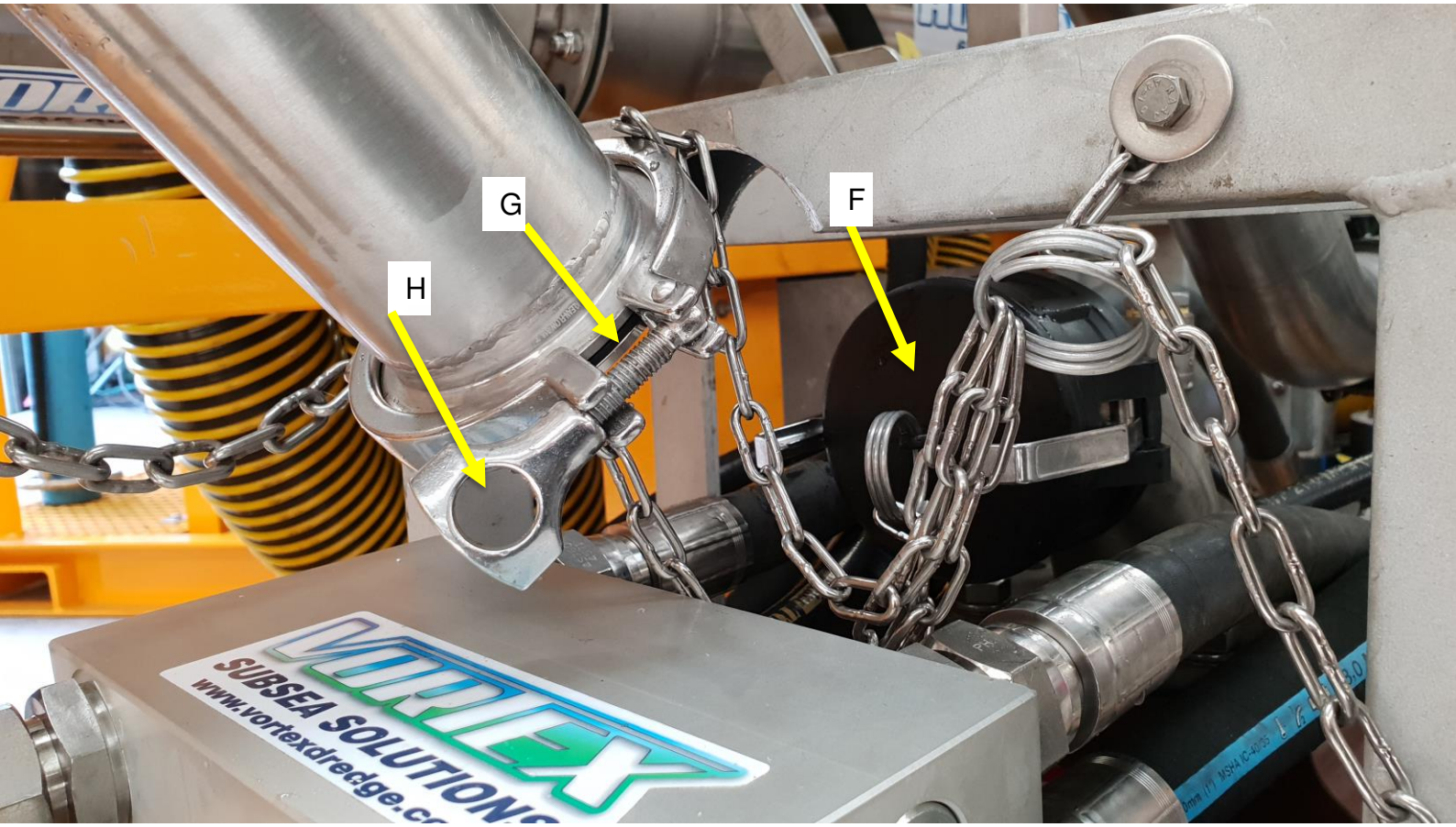
How to configure for single pump use:



1. Remove cam locks front “A” and rear “B” pumps, 180 degree 4 inch bend “C”, unbolt 3 inch clamp “D” and remove Tri-clove clamp “D”.
2. Fit 3 inch cam lock blank to front pump “A”

3. TECHNICAL SPECIFICATIONS

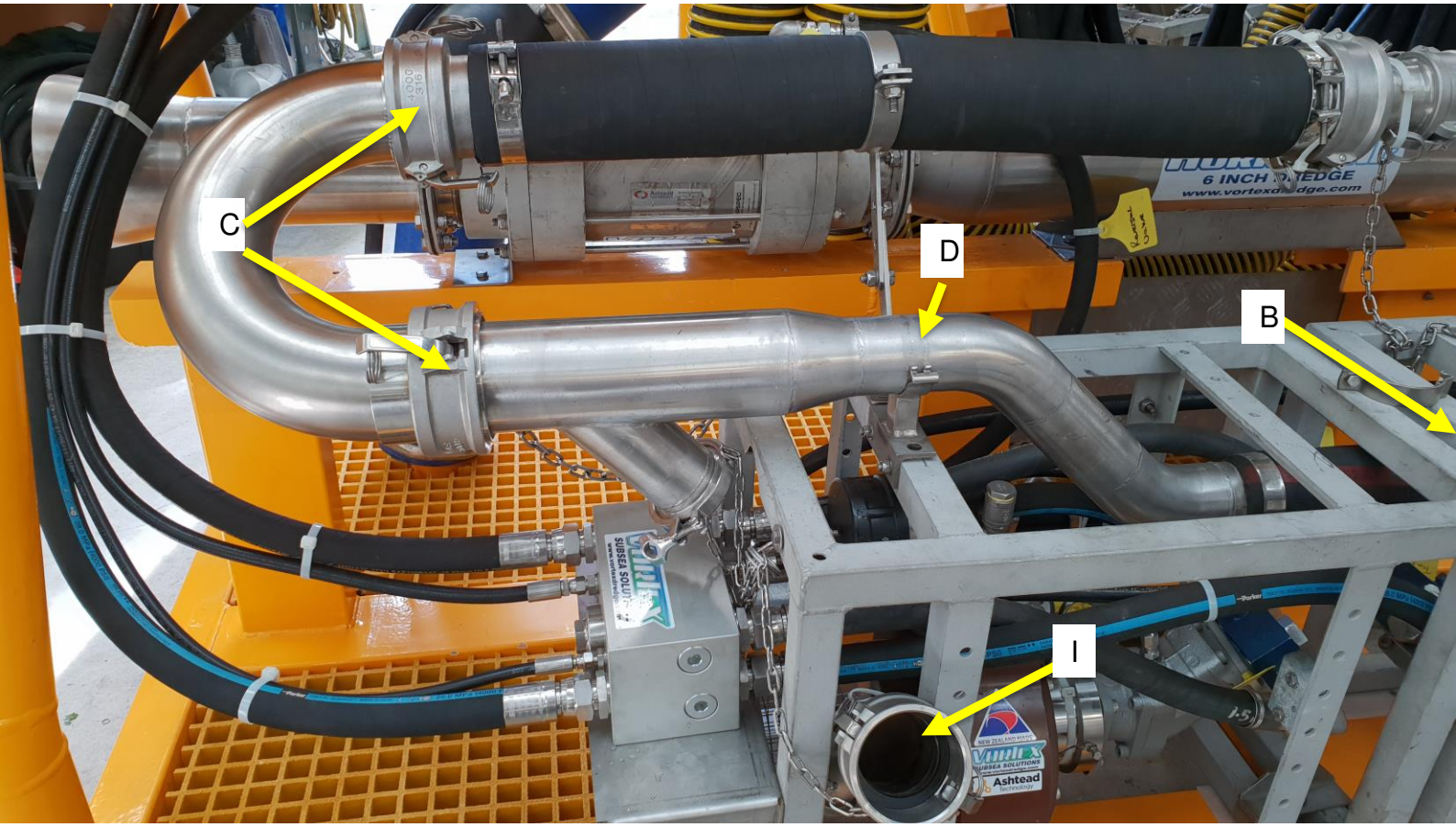
3.7 How to configure for single pump use continued:



2. Fit 3 inch cam lock blank to front pump “F”, fit blanking plate to 3 inch Tri-clove clamp. Cable tie Tri-clove nut secured “H” (cable tie not shown)

3. TECHNICAL SPECIFICATIONS

3.8 How to configure for single pump use continued:



3. Re fit cam locks rear “B” pump, 180 degree 4 inch bend “C”, bolt on 3 inch clamp “D” and secure 3 inch cam lock to Tri-clove bend “I” to frame where convenient.

4. Pre Dive Checks

4.1 Pre Dive Checks

	PROCEDURE DESCRIPTION	CHECK
1	Check all fittings and fasteners that none are loose.	
2	Check you have the correct hydraulic supply to the skid.	
3	Connect hydraulic hoses to hydraulic panel ensuring clean connections. **BEFORE** diving, bleed the hydraulic system at very low hydraulic input to fill the hoses and pumps with oil.	
4	Ensure dual ¾ inch black hoses are coiled correctly on hose storage beam before suction hose.	
5	Tie back suction hose to skid base using rings on base to prevent hose moving during descent.	
6	When just below the splash zone, run the pumps to fill the venturi and suction hose with water to bleed air out of them.	
7		

4. Post Dive Checks

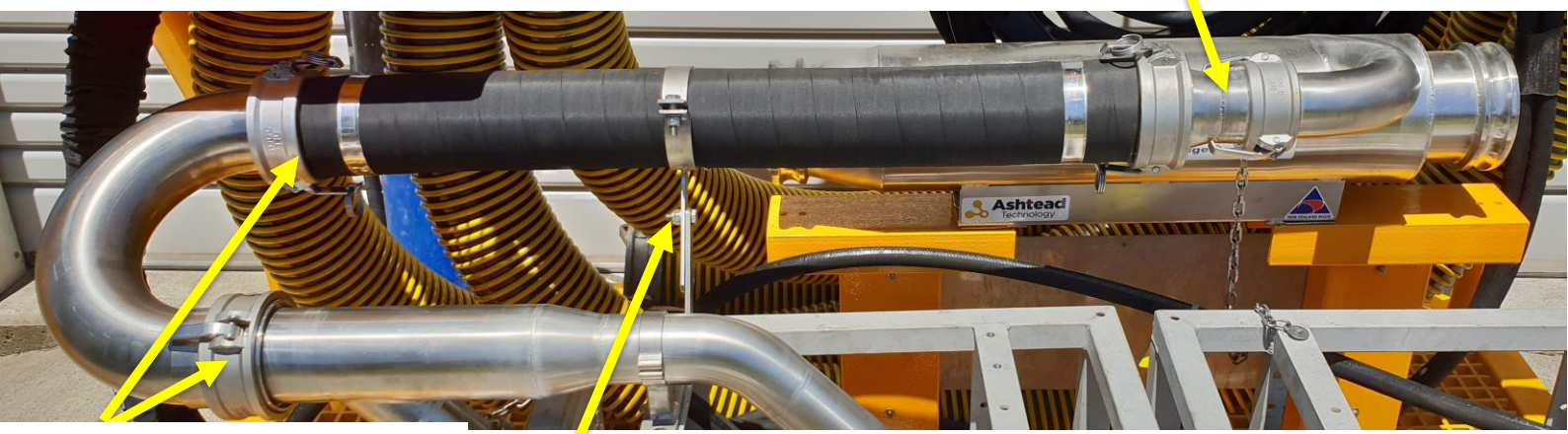
4.2 Post Dive Checks

	PROCEDURE DESCRIPTION	CHECK
1	Check all fittings and fasteners that none are loose.	
2	Always ensure the hydraulic connections are clean and washed with fresh water then sprayed with WD-40 or similar corrosion inhibitor.	
3	Check all hoses for damage and serviceable condition. Replace as necessary.	
4	Wash entire kit down with fresh water prior to shipping or storage.	
5	Inventory all components to confirm all that arrived with the kit also returns with the kit.	
6	Please give feedback on what can improved to suit your operation.	
7	Please report anything that does not look right.	

5. OPERATION

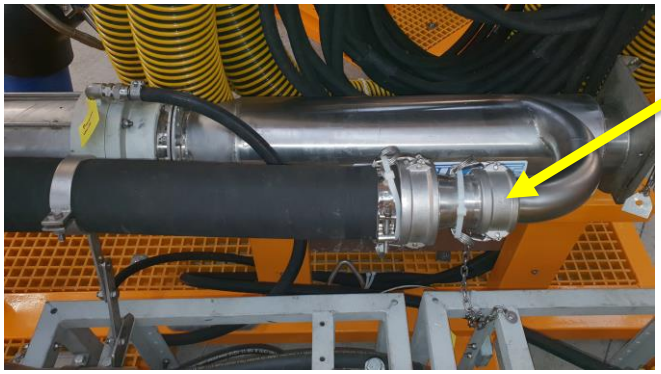
5.1 Setting up dredge kit.

- Pick size of venturi and reversal valve unit of your choice.
- Bolt venturi and reversal valve into place using slotted holes. Fit or remove this cam lock to suit different sized venturi. Components can only fit in one location so cam lock will become obvious.



Adjust to suit best position.

- Adjust stabilizer arm to allow black hose to have straight run to venturi. Adjust 180 “U” bend using cam locks to suit also.



4 and 6 inch venturi use 3 inch cam lock. Remove cam lock adapter for 8 inch venturi.. Connect cam lock to venturi BEFORE bolting venturi and reversal valve to skid.

Bolt venturi and reversal valve to skid through slotted holes.

- Connect suction hose to drop in fittings. Hose stubs are designed as push fit into hose but manufacturers tolerances can vary wildly so you may have to heat the suction hose using, heat gun, hot water or propane torch to soften hose and slide over hose stubs.

Drop in suction hose fitting.

Location pin for drop in suction hose fitting.

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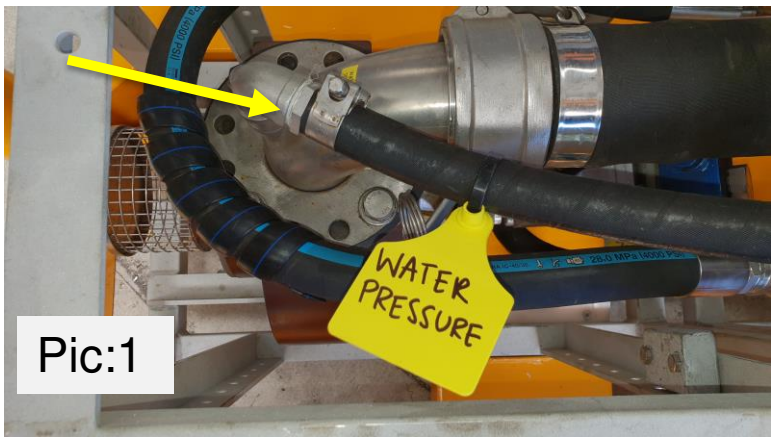
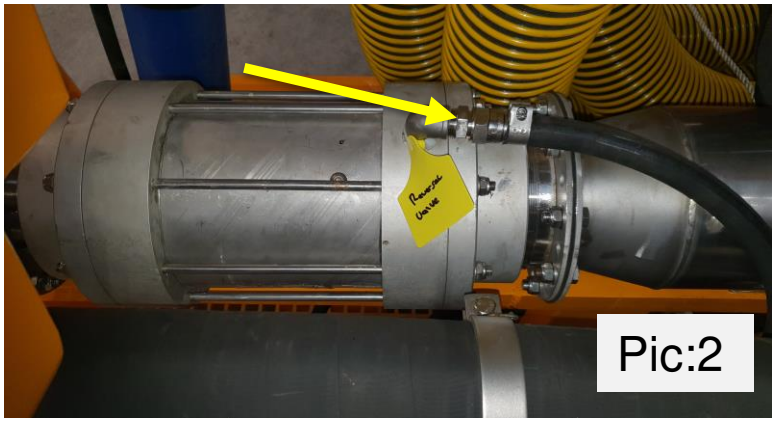
5. OPERATION

5.2 Setting up dredge kit.

1. ¾ black water feed hose to water pump outlet is always connected. Pic:1.
2. Connect ¾ black water hose to reversal valve. Pic:2
3. Connect ¾ inch hoses to suction nozzle. Pic 3
4. Load dual ¾ inch black hoses onto storage support beam using “French coiling” or “over loop / under loop” method so it pulls off straight. Pic: 6 next page.
5. Ensure hose retaining ring is secured with quick release pin. Pic:5
6. Connect “drop in” fitting of suction hose into venturi, fit locating pin then load suction hose onto storage support beam leaving the suction nozzle to slide over storage spike ready for removal by diver on seabed. Pic:4



Pic:1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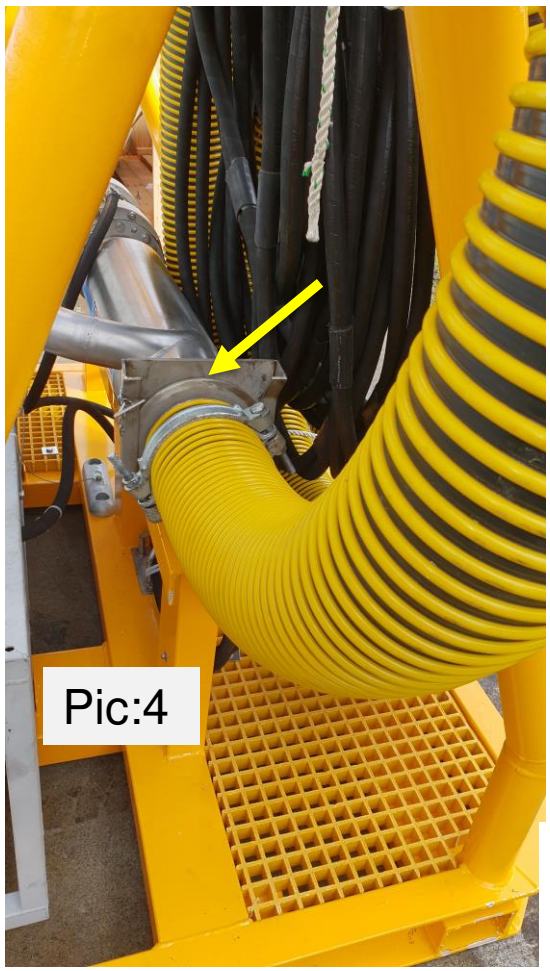
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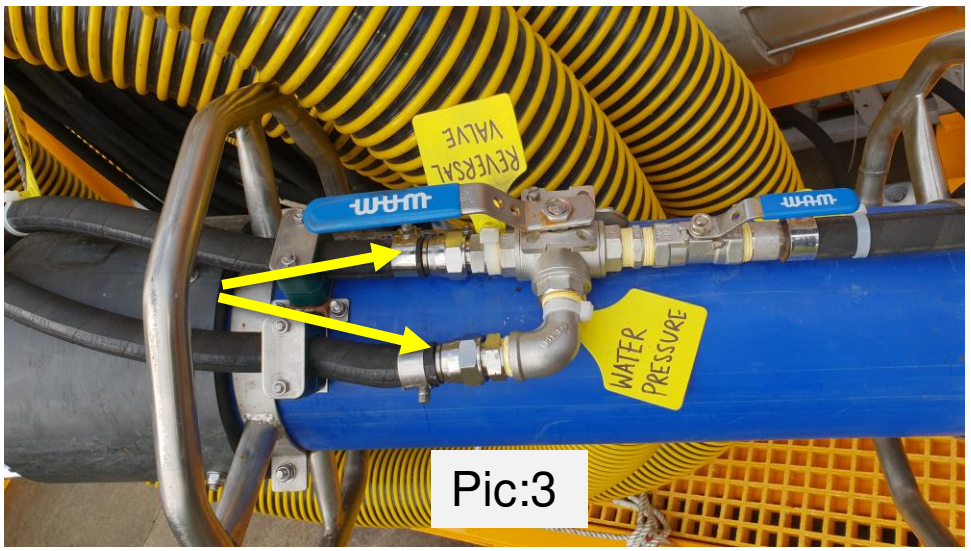
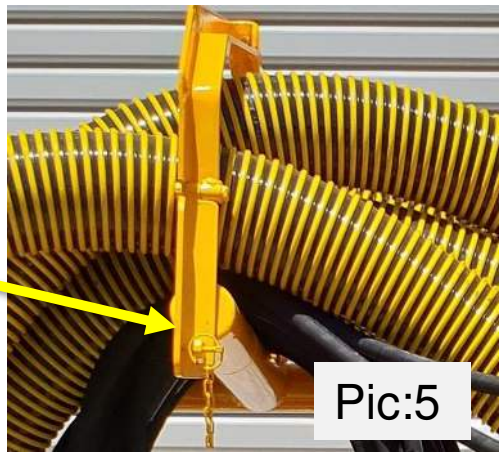


Pic:3


Pic:5

5. OPERATION

5.3 Setting up dredge kit.

- Connect hydraulic hoses. ENSURE HYDRAULIC SUPPLY IS WITHIN SPECIFICATIONS. Always ensure the hydraulic connections are clean and washed with fresh water then sprayed with WD-40 or similar corrosion inhibitor. Pic: A
- 

Pic:A


Shown ready to deploy overboard.

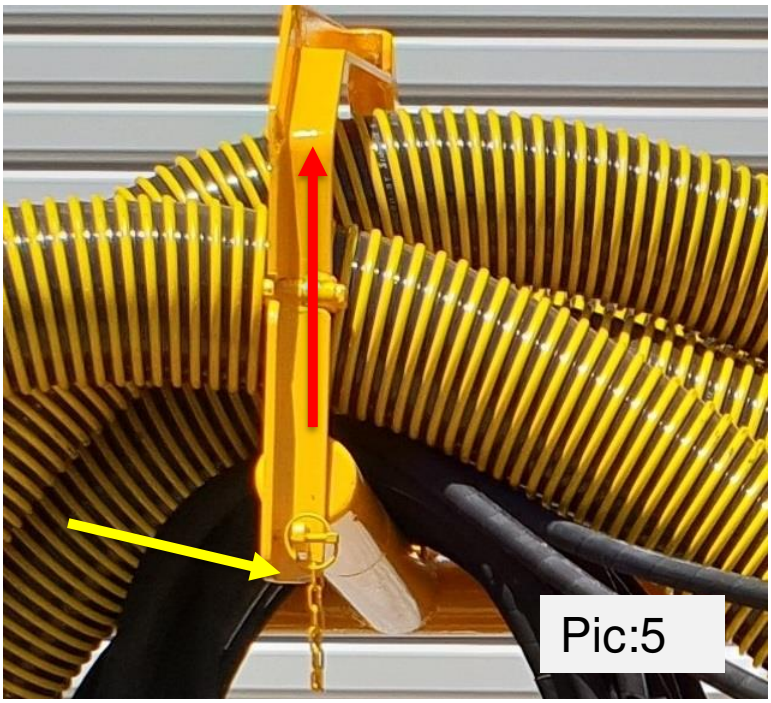
Load dual ¾ inch black hoses onto storage support beam using “French coiling” or “over loop / under loop” method so it pulls off straight. Pic: 6 below.

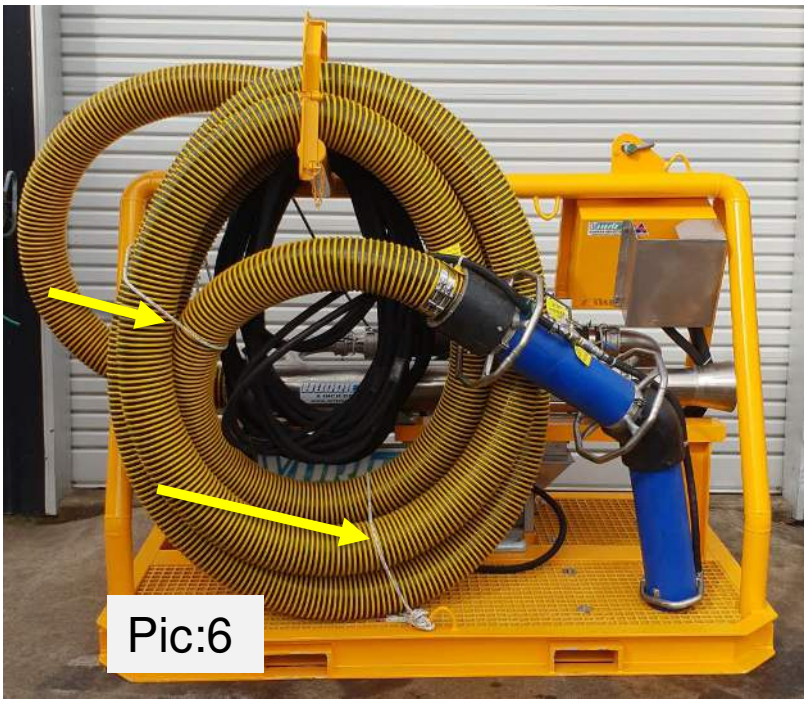
VERY IMPORTANT: When just below the splash zone, run the pumps to fill the venturi and suction hose with water to bleed air out of them.


Pic:6

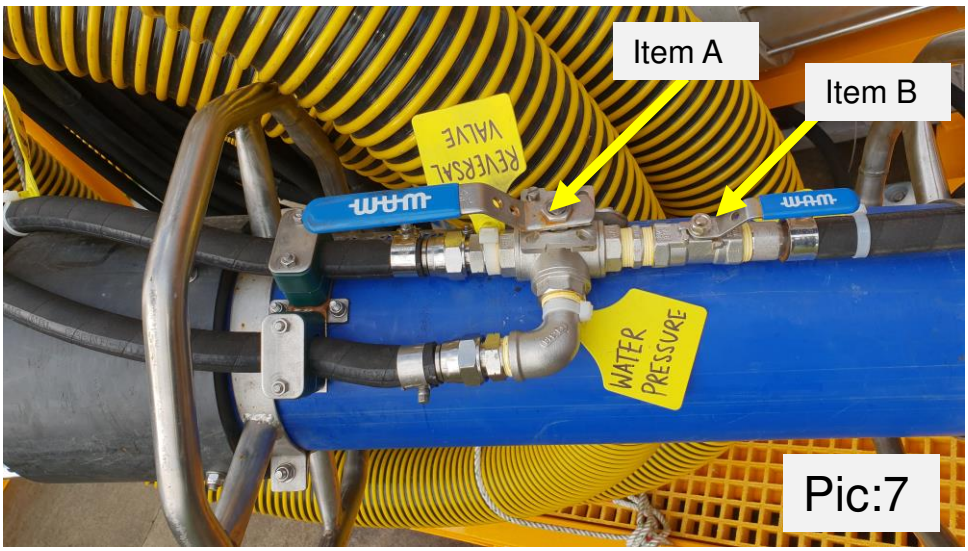
6. OPERATION

6.1 Operation on seabed


Pic:5


Pic:6

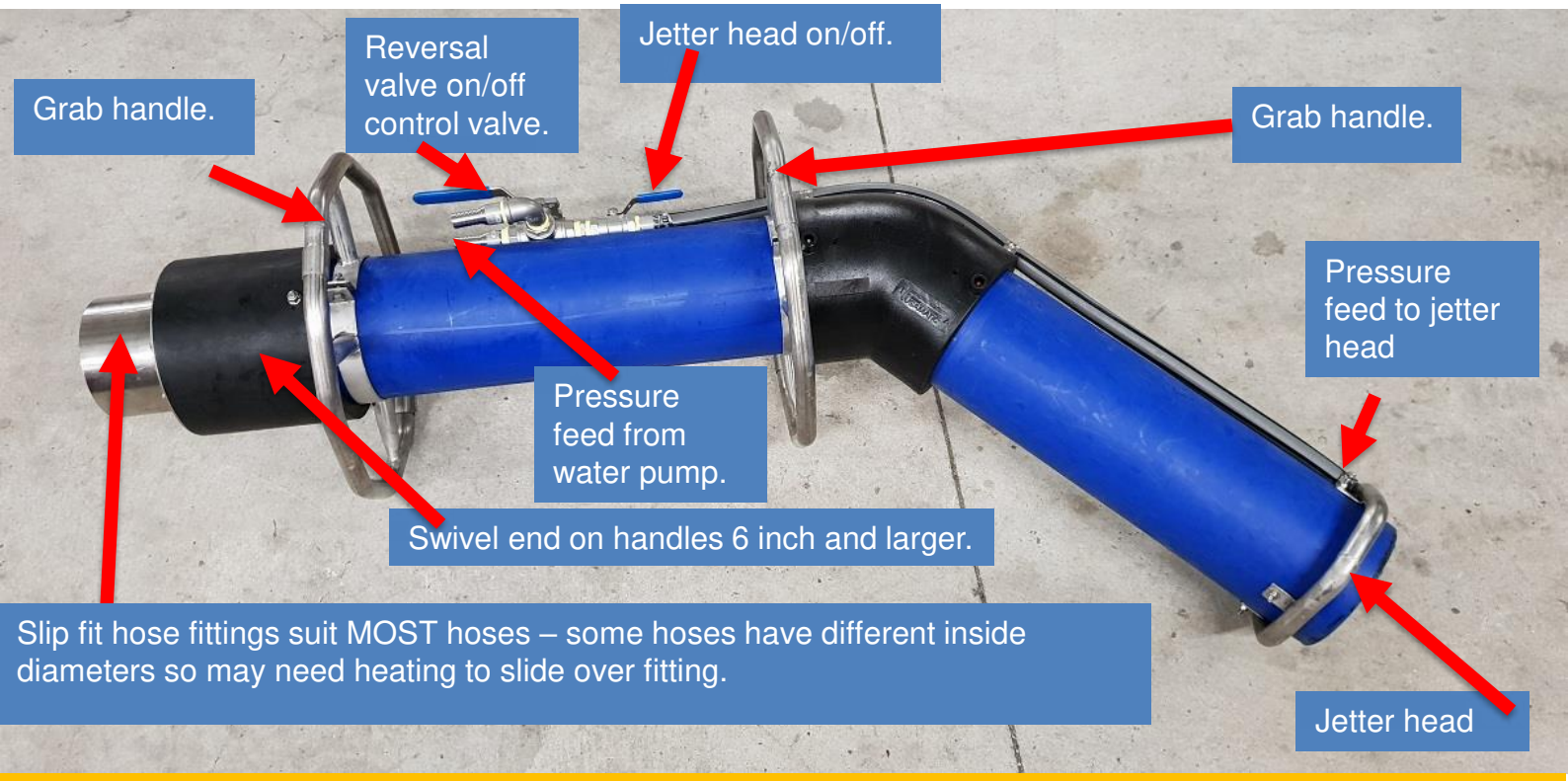
- Once landed on seabed, diver unlips quick release pin from hose retaining ring and flip hose retaining hoop back Pic:5
- Untie ropes from skid base tie back rings. Pic 6.
- Pick up suction nozzle off storage spike, walk to work area pulling hoses off hose storage bar as you go, give instructions for topside to open hydraulics to skid, begin work.
- Function reversal valve to change direction of flow through suction hose Item A, Pic 7.
- Function the jetter nozzle valve to flow water through jetter nozzle. Item B, Pic 7.



Pic:7

6. OPERATION

6.2 Divers handle.



Very lightweight suction nozzles. In water weights:
8 inch =10kg, 6 inch = 6kg, 4 inch = 4kg. Less diver fatigue. Easy.

Diver operated reversal valve and jetter. Diver can control suction power / dredge on - off. Safe and Easy.

6. OPERATION

6.3 Rock and sand bag relocation.

Bolt a bar across the front if dredging or leave open to suck onto large rocks or sand bags to lift away for relocation.

- 4 inch capable of 70kg of suction / rock lift.
- 6 inch capable of 146kg of suction / rock lift.
- 8 inch capable of 107 of suction / rock lift.

Connect tugger line to suction nozzle to lift rock or sand bag. Diver simply functions water operated reversal valve to drop the rock. Less diver fatigue. Designed so diver stands upright, arms outstretched and relaxed. Safer, EASY.

- Very lightweight suction nozzles. In water weights:
- 8 inch =10kg, 6 inch (shown above) = 6kg, 4 inch = 4kg.
- Less diver fatigue. Easy.

Jetter head specs:

80lpm at 59psi with 150lpm hyd input.
100lpm at 88psi with 180lpm hyd input.
113lpm at 120psi with 200lpm hyd input.

YOUR SAFETY IS YOUR RESPONSIBILITY. PLEASE ASK IF YOU ARE UNSURE ABOUT ANYTHING.

6. OPERATION

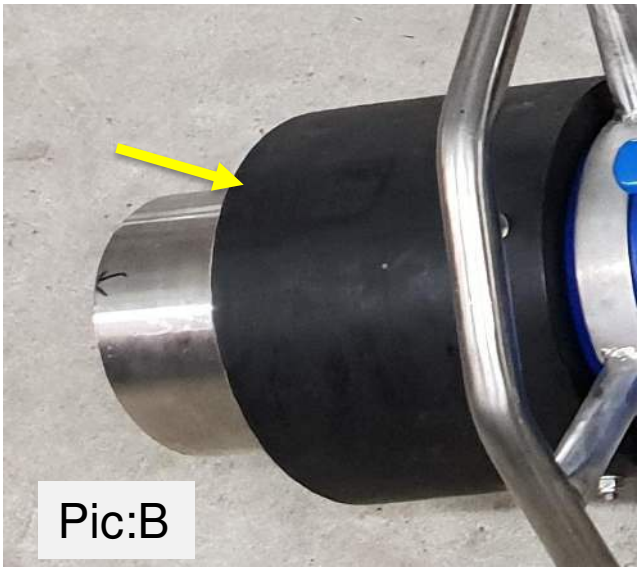
6.4 Recovery from seabed.

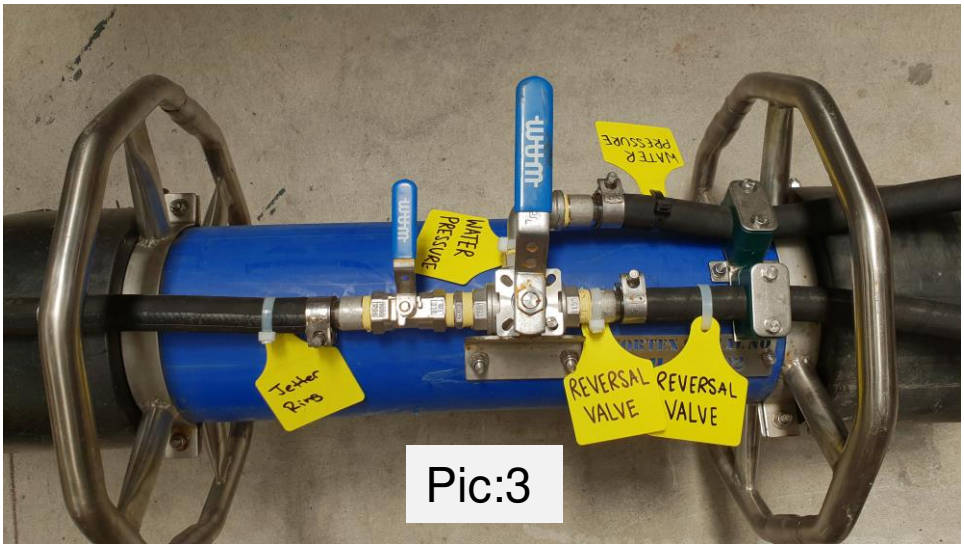
- To begin recovery, coil hoses back onto storage support beam or skull drag the skid and hoses back on deck to re assemble hoses back on deck as per usual.

7. Servicing.

- Always ensure the hydraulic connections are clean and washed with fresh water then sprayed with WD-40 or similar corrosion inhibitor. Pic: A
- Periodic stripping of suction nozzle swivels may be required to remove fine grit build up. ALWAYS assemble clean and dry without lubricant. Pic:B
- Check all fasteners on suction nozzle Pic:3
- Wash entire kit down with fresh water prior to storage.
- Check all fittings and fasteners that none are loose.
- Please report anything that does not look right.

Pic:A


Pic:B



Pic:3

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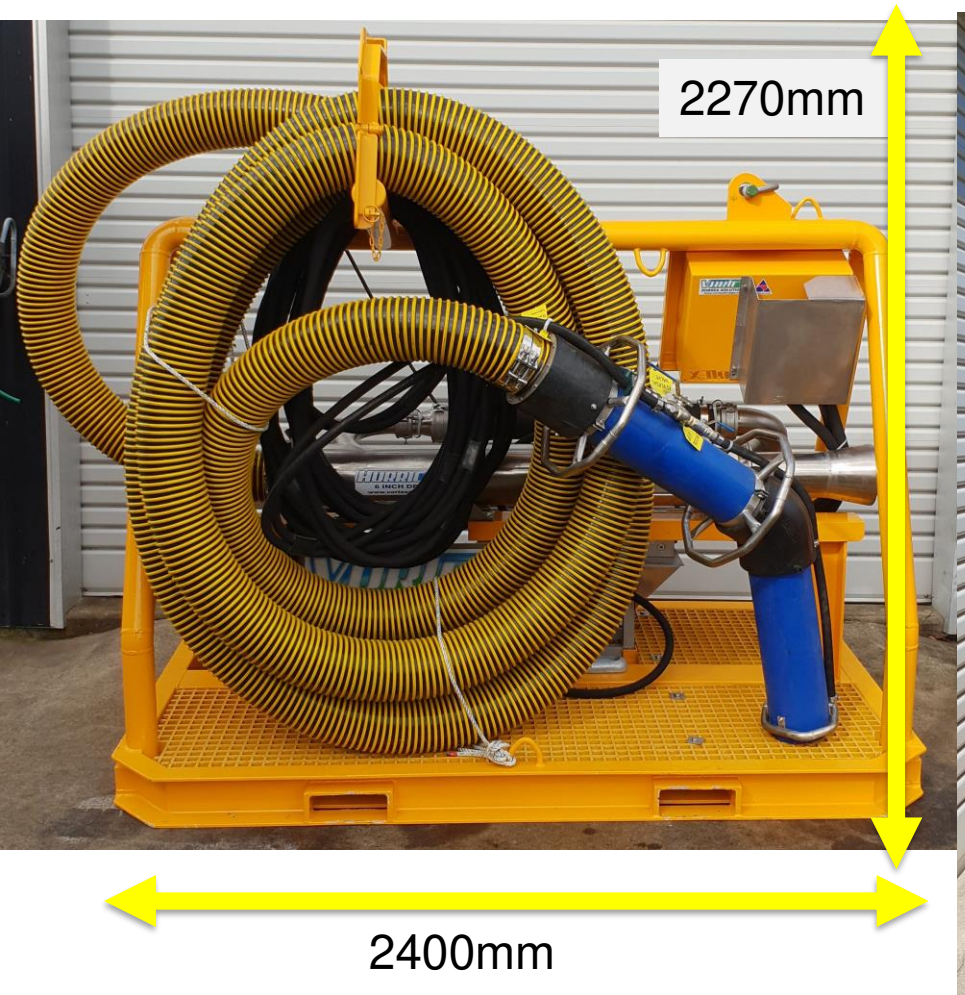
8. Skid dimensions

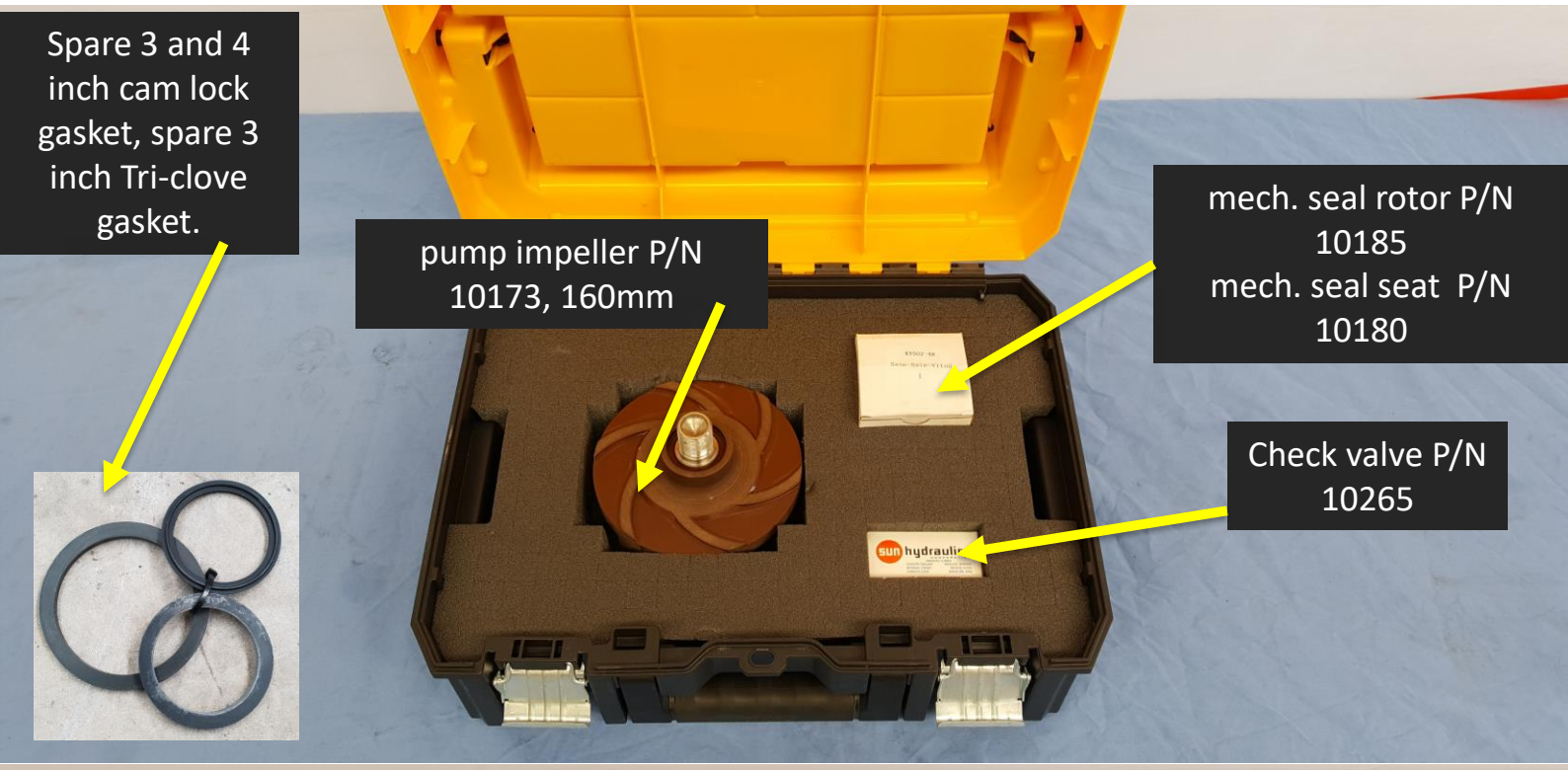


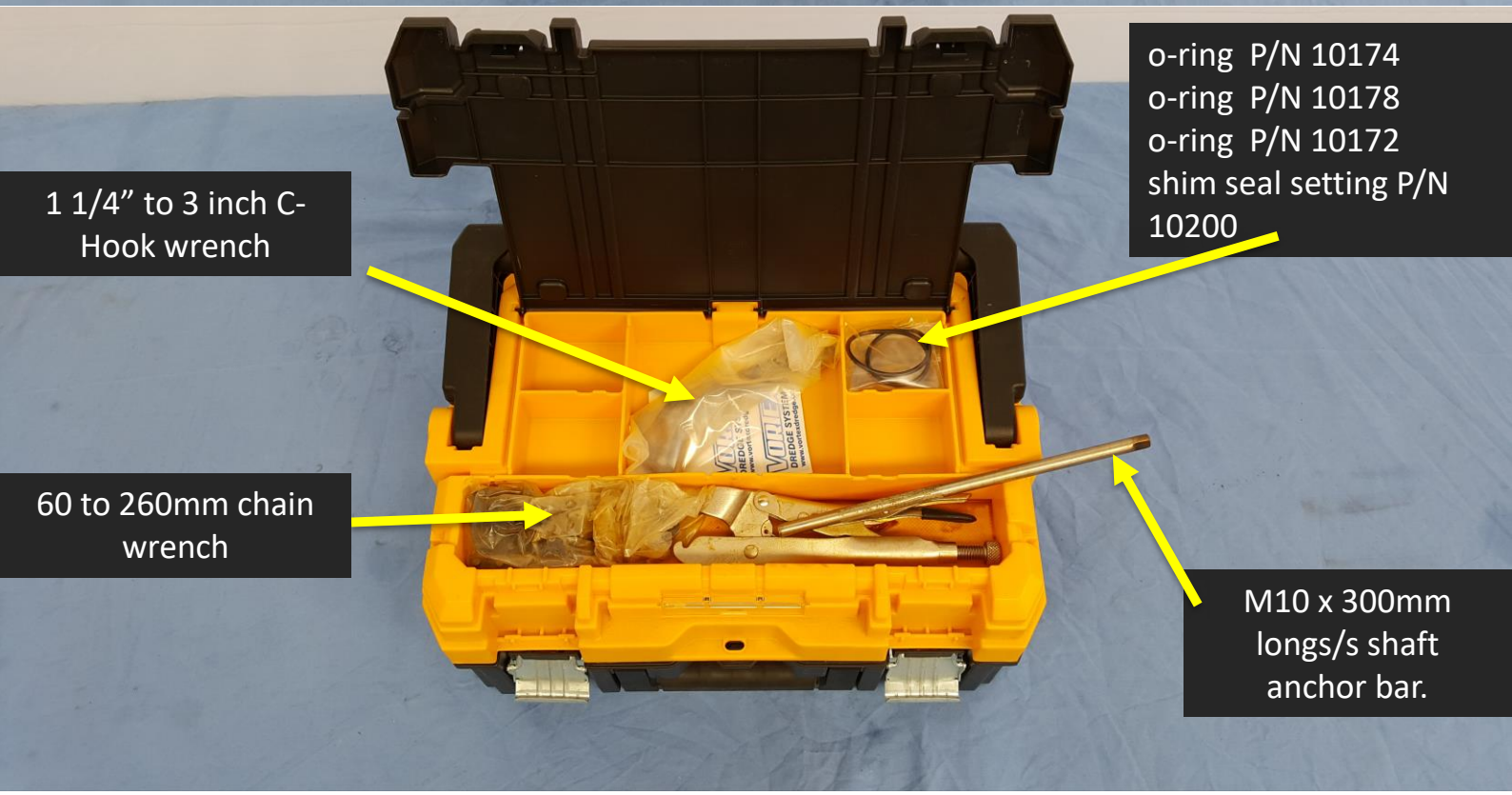
- Vortex Frame dimensions:
- 2400 mm (94.5 inch) long
- 1500 mm (59 inch) wide
- 2270 mm (89 inch) high (highest point)
- WEIGHT = 1256kg (2314 lb) with 8 inch kit
- WEIGHT = 1150kg (2769 lb) with 6 inch kit as shown above.

9. Water pump spares inventory.

9.1 Inventory

Morris toolshed: DWST1-70704
TSTAK 1
$104.80 +GST





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10. Full skid kit Inventory as shipped

Skid # VEASYD-0X

Diving handle:
#DH8-XX
#DH6-XX
#DH4-XX

Water pump: 25cc
#V10XX
#V10XX

Venturi:
8 inch
6 inch
4 inch

Reversal valve:
8 inch
6 inch
4 inch

Manuals:
Water pump maintenance manual
Operations manual
Rigging load test cert
Skid lifting pad eyes cert
MERLETT Suction hose information
Inventory

Rigging slings:

Suction hose fittings:
One x 8 inch drop in suction inlet hose tail / flange
One x 6 inch drop in suction inlet hose tail / flange
One x 4 inch drop in suction inlet hose tail / flange

Water pump spares:
1 x pump impeller P/N 10173. 160mm
1 x o-ring P/N 10174
1 x o-ring P/N 10291
6 x shim seal setting P/N 10200
6 x shim impeller setting P/N 10201
1 x mech. seal rotor P/N 10185
1 x mech. seal seat P/N 10180
1 x o-ring – volute - P/N 10172
1 X Check Valve cartridge – P/N 10265
1 x M10 x 200mm long s/s shaft anchor bar.
1 x Spare 3cam lock gasket
1 x spare 4 inch cam lock gasket
1 x spare 3 inch Tri-clove gasket

11. Trouble shooting

- **Low suction performance.**
  Check HPU hydraulic pressure capability matches or exceeds skid requirements as per page 8.
  Check hydraulic pressure on skid panel. Ensure 3000psi is seen. If not at 3000psi, look at HPU supply pressure and raise pressure to suit.
  Check HPU hydraulic flow capability matches or exceeds skid requirements as per page 8.
  Check hydraulic hose lengths and pressure drop as per page 9.
  Ensure any cam lock fittings are secured and have gaskets.
  Ensure no suction hose blockage – operate reversal valve if required.

- **Reversal valve not working.**
  Check ball valve on divers suction handle is operational.

12. Contacts

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