



Eco-Energy

Electric 4 inch ROV dredge

www.vortexdredge.com

VORTEX
SUBSEA SOLUTIONS

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INVENTORY

- Frame complete with electric motor, pump, “U” bend and compensators.
- Venturi.
- ROV manipulator handle water jetter ring mounted on 4 inch stainless tube suction inlet.
- Hydraulic operated ball valve with two x 500mm long hydraulic hoses with -4 jic male swivel fittings at each end.
- Spare venturi exhaust cone.
- 4 mtr long water pump to remote mount Venturi hose with 3 inch female cam locks at each end.
- One x 4 inch female cam lock to 4 inch hose tail for Exhaust hose.
- One x 4 inch female cam lock to 4 inch hose tail for suction hose.
- One x 4 inch male cam lock to 4 inch hose tail for Exhaust hose to reversal valve.
- Reversal valve with two x 4 mtr long hydraulic hoses with -4 jic male swivel fittings at each end.
- Water pump spares kit.
- Three manuals.
- Compensator filling bottle.
- 5 mtr long 20mm hose with 4 x hose clamps for jetter kit.

INTRODUCTION

- This 4 inch dredge was designed around being a plug in system to the SAAB Leopard ROV where the Leopard AUX HPU would be unbolted and this motor/pump unit bolt in place and plug into the standard Leopard high voltage and low voltage cables.
- This system can be fitted to any ROV compatible with the power supply required by this motor.
- This 4-inch dredge has shown under real world conditions to provide suction performance of 64 kpa.
- Motor and coupling are both filled with environmentally friendly biodegradable oil.
- Optional flotation is also available.

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

SPECIFICATIONS

- Debris removal of at least 22 m³/hr, 50 ton/hr, 10% solids by volume and tested using Magnetite rocks 40 to 100mm diameter.
- Venturi inner diameter [mm] 100 mm
- Rated maximum stone size 98 mm
- Water pump flow = 55 m³/hr plus
- Suction hose diameter 4 in / (100 mm)
- Exhaust hose diameter 4 in / (100 mm)
- Inlet suction hose length custom length
- Exhaust throw length: 6 mtr - but it is best to keep the inlet hose longer due to exhaust back pressure reducing performance of ALL venture type dredge units.
- The current draw on this motor which is 15kW 20HP 2 Pole 3000V 60Hz is 3.7 amps.
- Coupling compensator YES
- Motor compensator YES
- Operating depths unrestricted
- Operate pump in air YES
- Flotation - optional
- Available suction at inlet Standard is 64 kpa plus
- Optional Jetter nozzle water pressure = 60psi plus (4.1 Bar plus)

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OPERATING LIMITS

- The operating limit for the Vortex Eco-Energy 4-inch, will be the responsibility of the Senior ROV person on-site.
- The limitation being the ability to safely deploy and recover the ROV system with the Vortex 4-inch attached. Care must be taken whilst during launch and recovery operations to prevent damage to all components of the dredge system and the ROV.

SAFETY

- Personal protection equipment recommended for use when working on ship/platform deck
- Hard hat
- Safety glasses
- Gloves
- Safety boots
- Overalls

RISK – NORMAL OPERATIONS

- High voltage.
- All personnel involved in deck operations shall be aware of the potential risk described hereafter.
- Crane Handling (possible danger of e.g. heavy falling object)
- Launch and recovery of equipment over the side of the vessel
- Personnel working over open sea (typical personnel working with launch and recovery of equipment from vessel deck or moon pool)
- Object falling down from height (rocks following the equipment when recovering)

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USER CHECKLIST BEFORE DIVE

To prevent any damage to the equipment this checklist must be followed.

PROJECT: _____

DREDGE NO: _____

ITEM	DESCRIPTION	CHECKED	COMMENTS	DATE
1	Ensure ROV can and does supply correct power supply before operating			
2	All fittings are checked for leakage			
3	All hose clamps are checked			
4	Pumps are fastened - no loose screws			
5	Suction hose is fastened			
6	Dredge is fastened – no loose ends			
7	All hoses are fastened and in proper condition			
8	Filter for induction is mounted in <u>clean water</u>			
9	No hoses are squeezed or bent			
10	Inlet nozzle is mounted correctly			

Comments: _____

Dredge is Checked By: _____

Date: _____



USER CHECKLIST AFTER DIVE

To prevent any damage to the equipment this checklist must be followed.

PROJECT: _____

DREDGE NO: _____

ITEM	DESCRIPTION	CHECKED	COMMENTS	DATE
1	Equipment used in the sea must be properly cleaned with fresh water			
2	All fittings are checked for leakage			
3	All hose clamps are checked			
4	Pumps are fastened – no loose screws			
5	Suction hose is fastened			
6	Dredge is fastened in proper condition			
7	No hoses are squeezed or bent			
8	Electric motor and coupling is fitted with clean oil			
9	Broken parts are reported to VORTEX			

Comments: _____

Dredge is Checked By: _____ Date: _____

What were the positives? _____

What were the negatives? _____

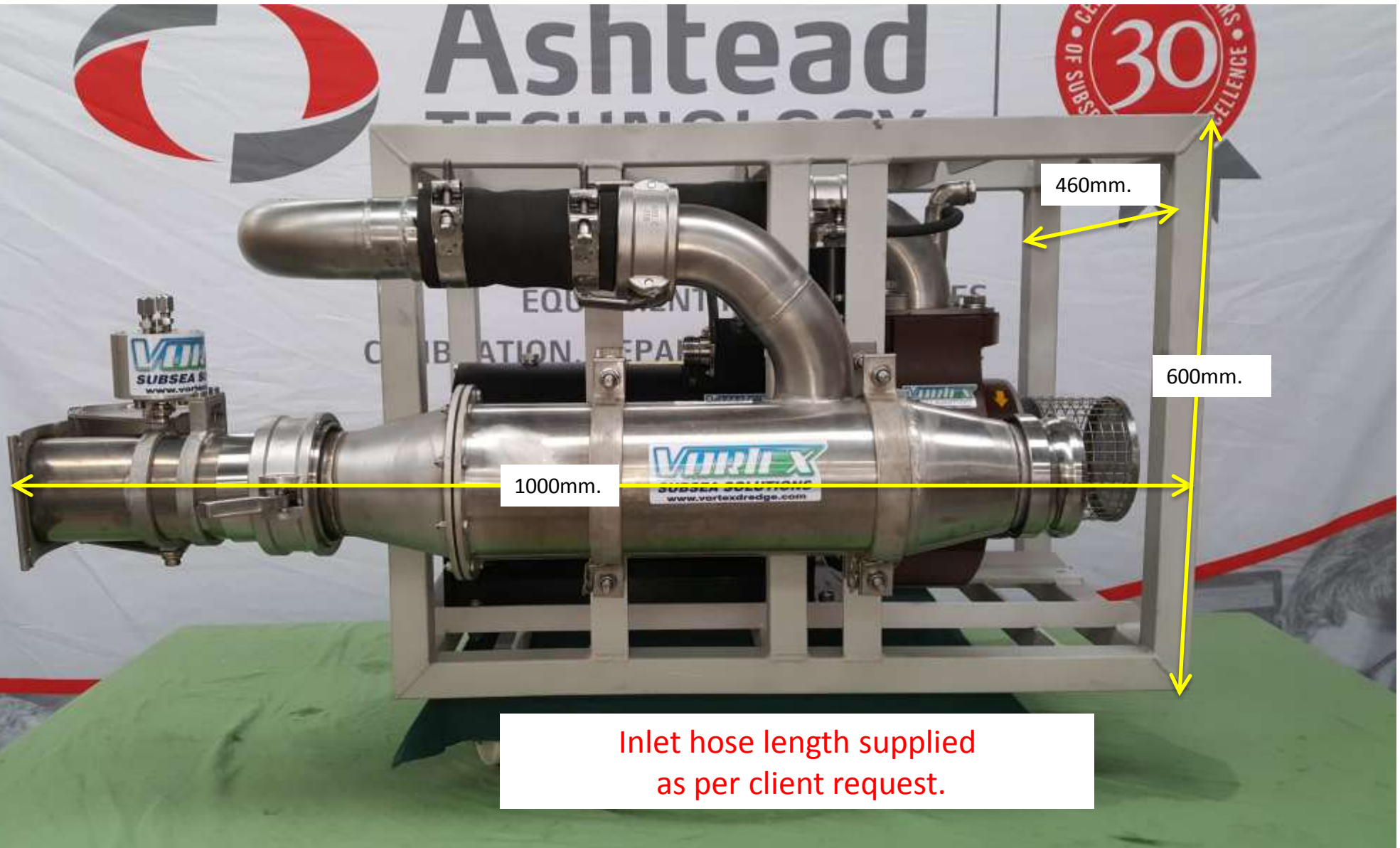
Suggestions to make this kit better for you to use in the field: _____



COMPONENTS – LAYOUT WITH FRAME

Weight of kit as shown = 163 kg (359 lb) in air

Weight of kit as shown = 98 kg (216 lb) in fresh water



Motor / water pump dimensions

Weight of motor/water pump as shown = 112 kg (246 lb) in air

Weight of motor/water pump as shown = 75 kg (165 lb) in fresh water



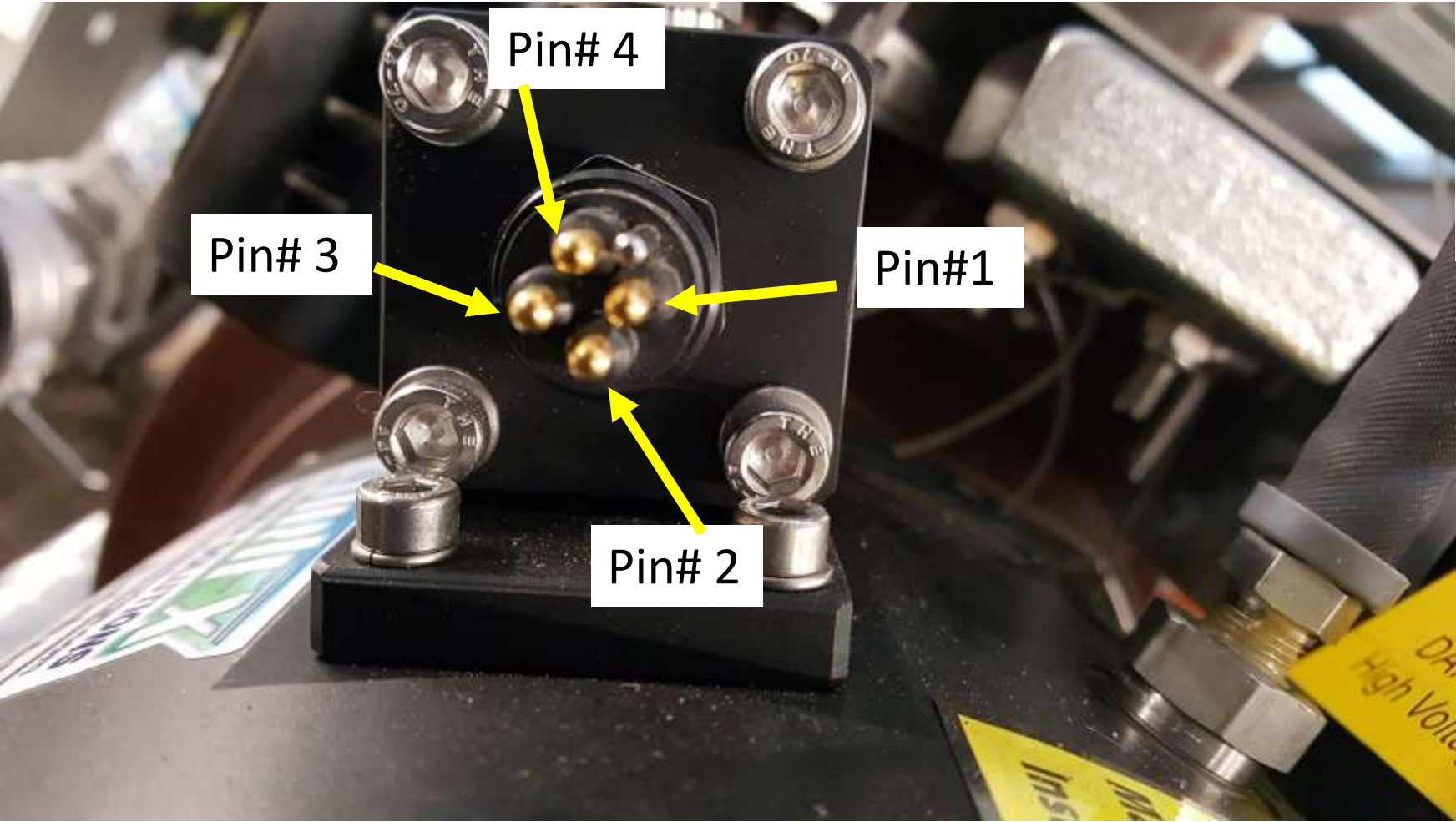
COMPONENTS – Removal from frame



Remove these four M12 bolts and slide motor/pump out of either end of frame.

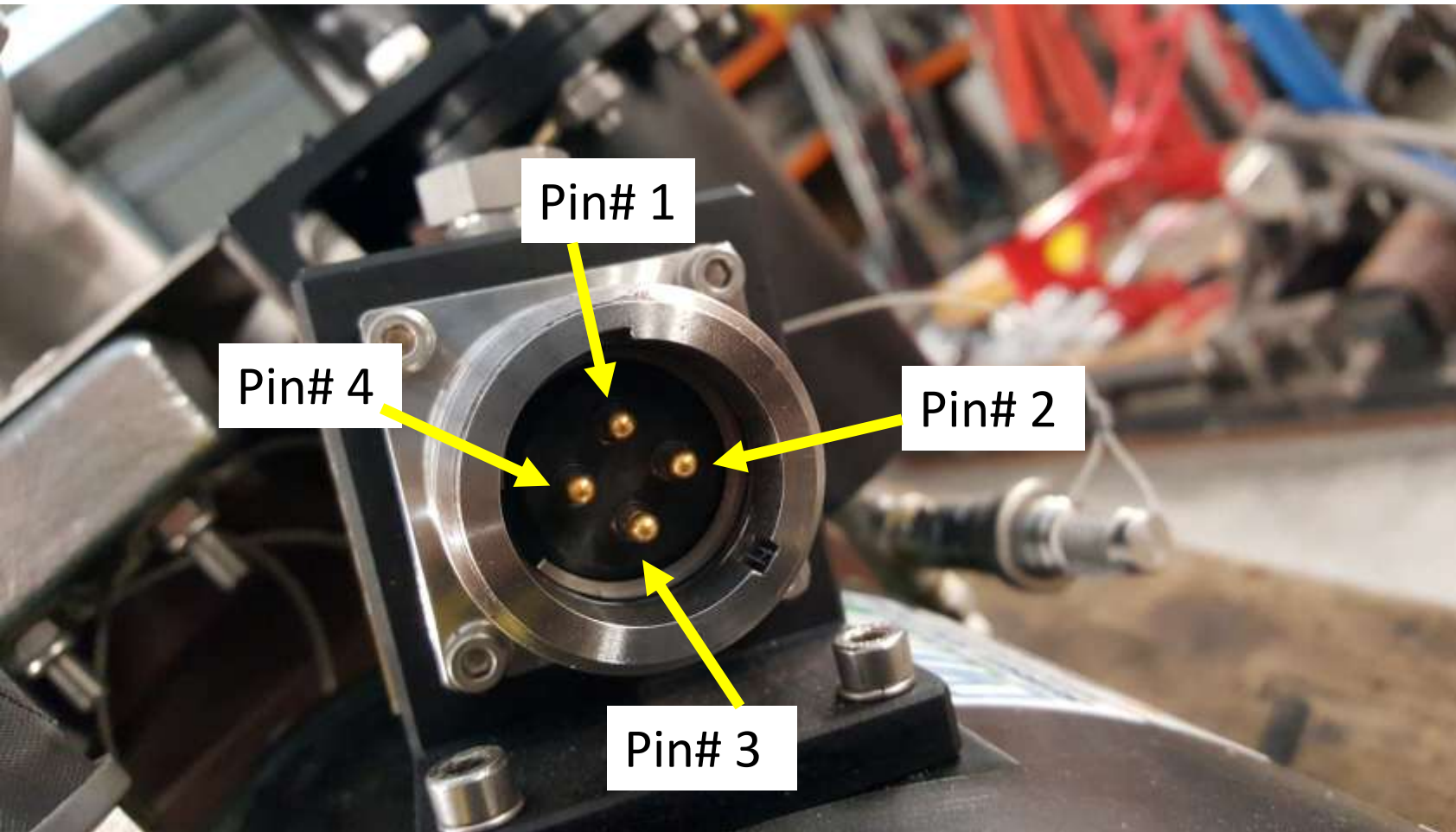
Remove this anode connector cable.

Subconn MCBH4M 4 Pin connector for temperature and water alarm:



Pin# 1 = Temperature
Pin# 2 = Temperature
Pin# 3 = Water alarm
Pin# 4 = Water alarm

BIRNS 30-FR 26558-24 connector for motor power:



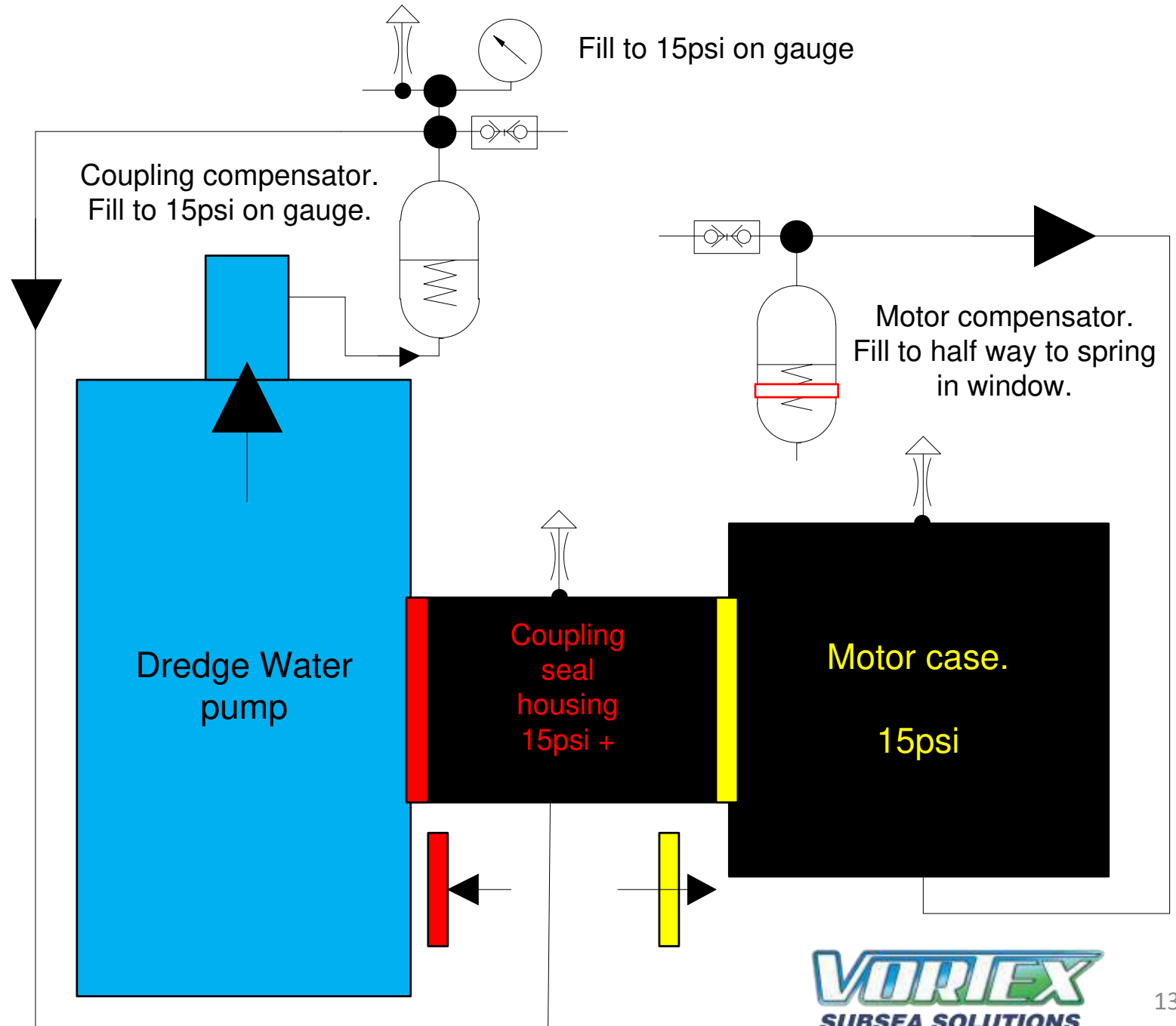
Pin# 1 = Phase
Pin# 2 = Phase
Pin# 3 = Phase
Pin# 4 = Earth

OPERATION – Motor and coupling compensators.

Mechanical water / oil shaft seal rated for 40 Bar (580psi) and has 15psi of static mechanical pressure constantly at work.

15 psi plus water pump pressure adding to comp pressure keeping mechanical seal in contact and water out of system.

Use only synthetic Biodegradable hydraulic oil such as PANOLIN ATLANTIS which is suitable for offshore and electrical applications.



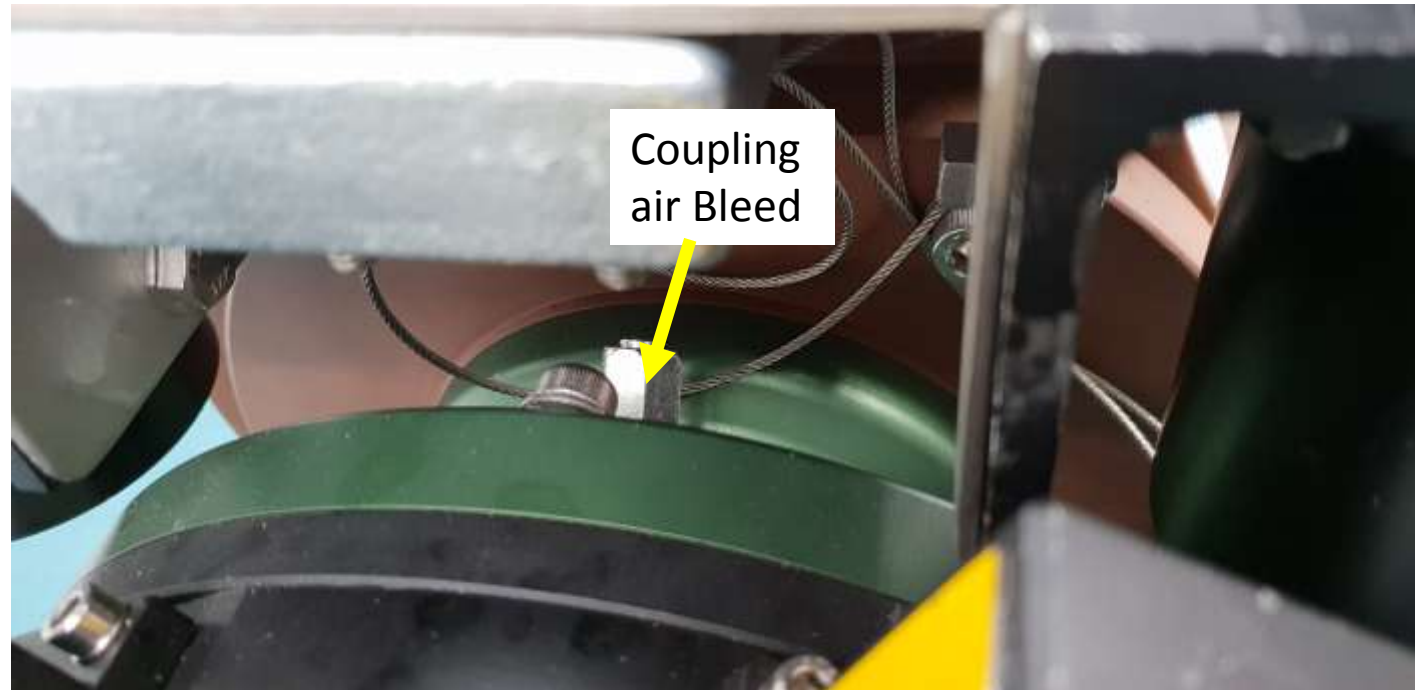
Compensators: Coupling compensator

Use only synthetic Biodegradable hydraulic oil such as PANOLIN ATLANTIS which is suitable for offshore and electrical applications.

Filling from empty: Pump oil into comp fill point until all air is bled from bleed point then pump oil into comp to set gauge at 15psi.

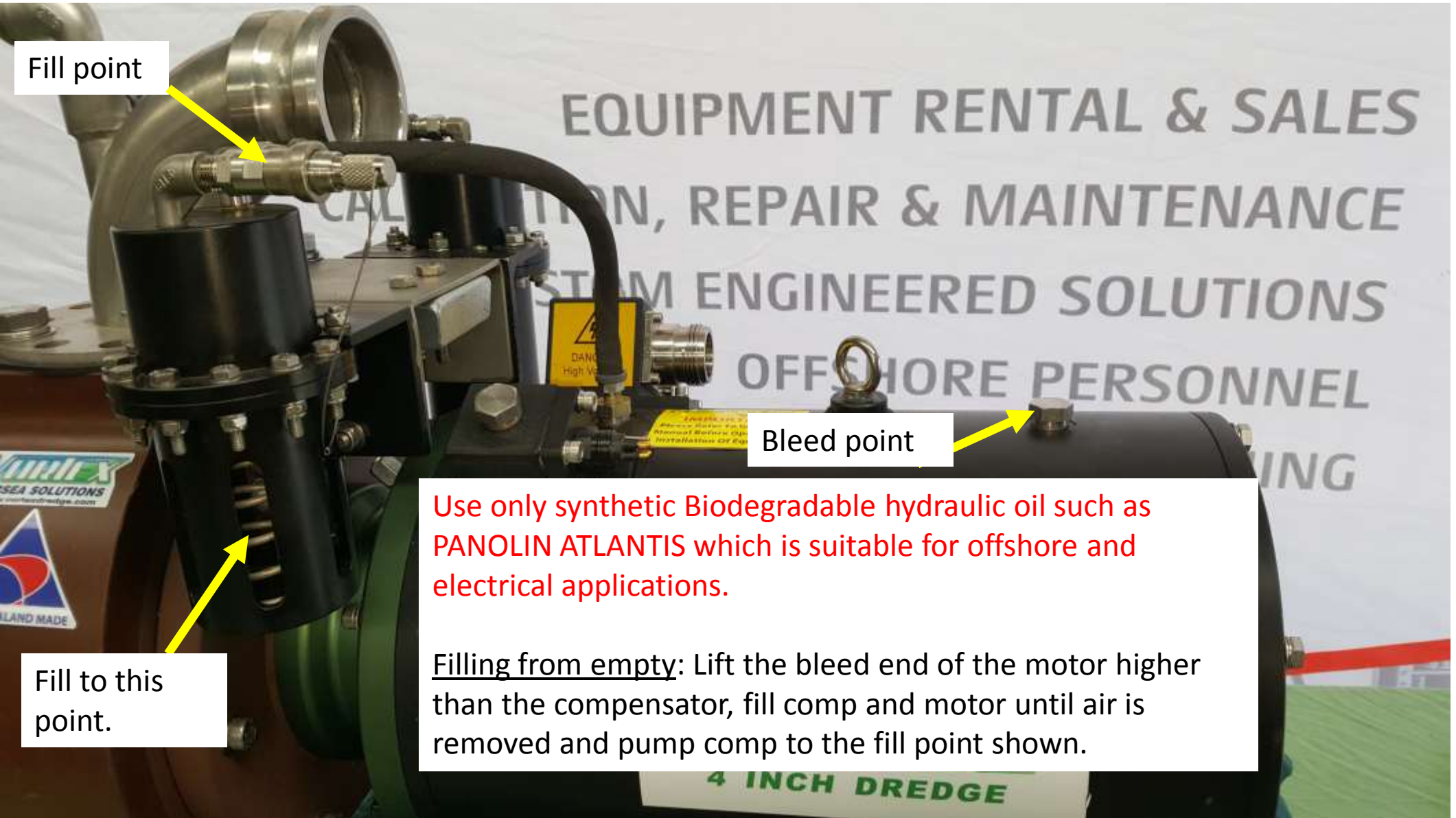


Water pressure from pump



Hose to coupling base

Compensators: Motor compensator



Fill point

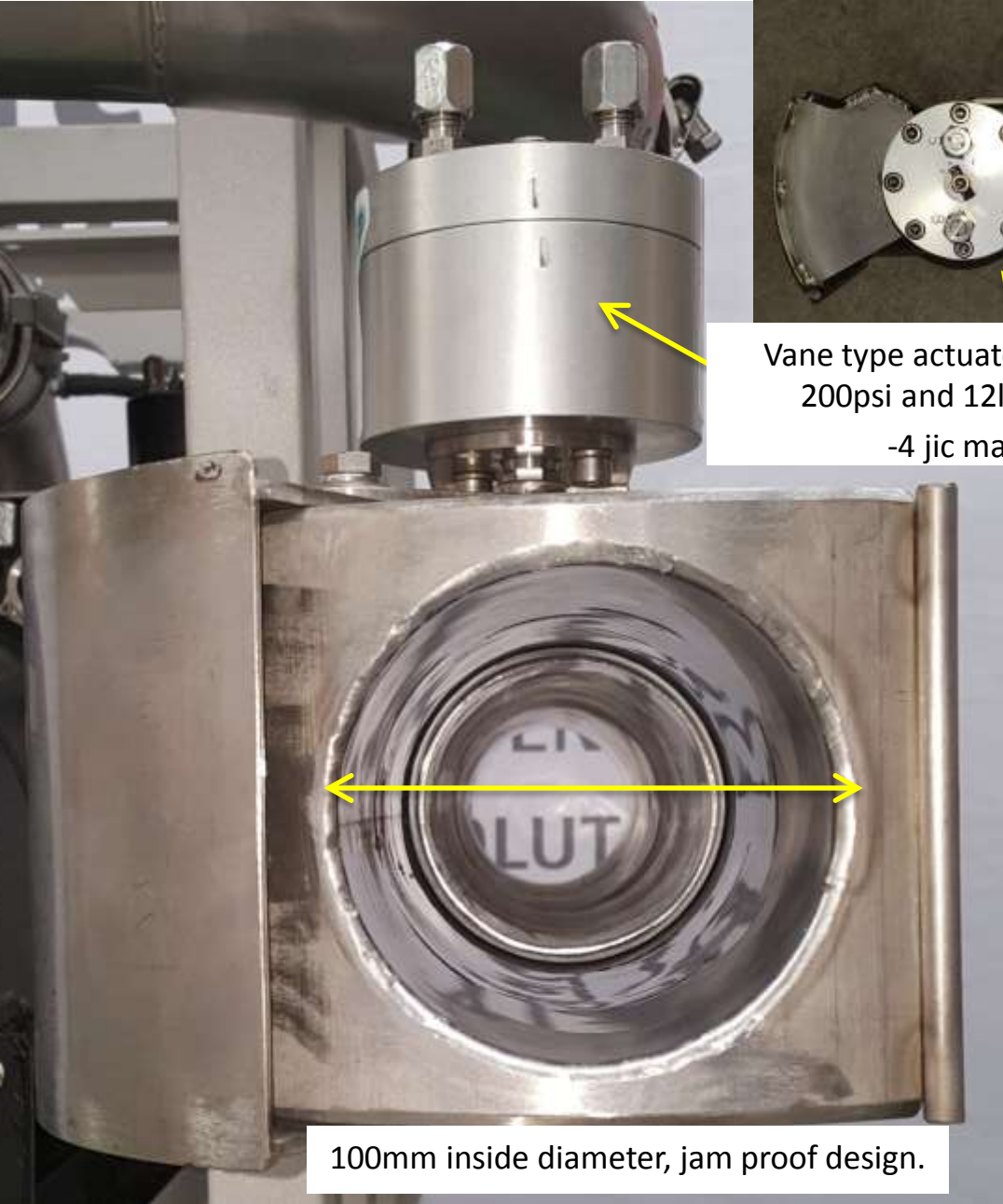
Bleed point

Fill to this point.

Use only synthetic Biodegradable hydraulic oil such as PANOLIN ATLANTIS which is suitable for offshore and electrical applications.

Filling from empty: Lift the bleed end of the motor higher than the compensator, fill comp and motor until air is removed and pump comp to the fill point shown.

COMPONENTS – REVERSAL VALVE



COMPONENTS – REVERSAL VALVE

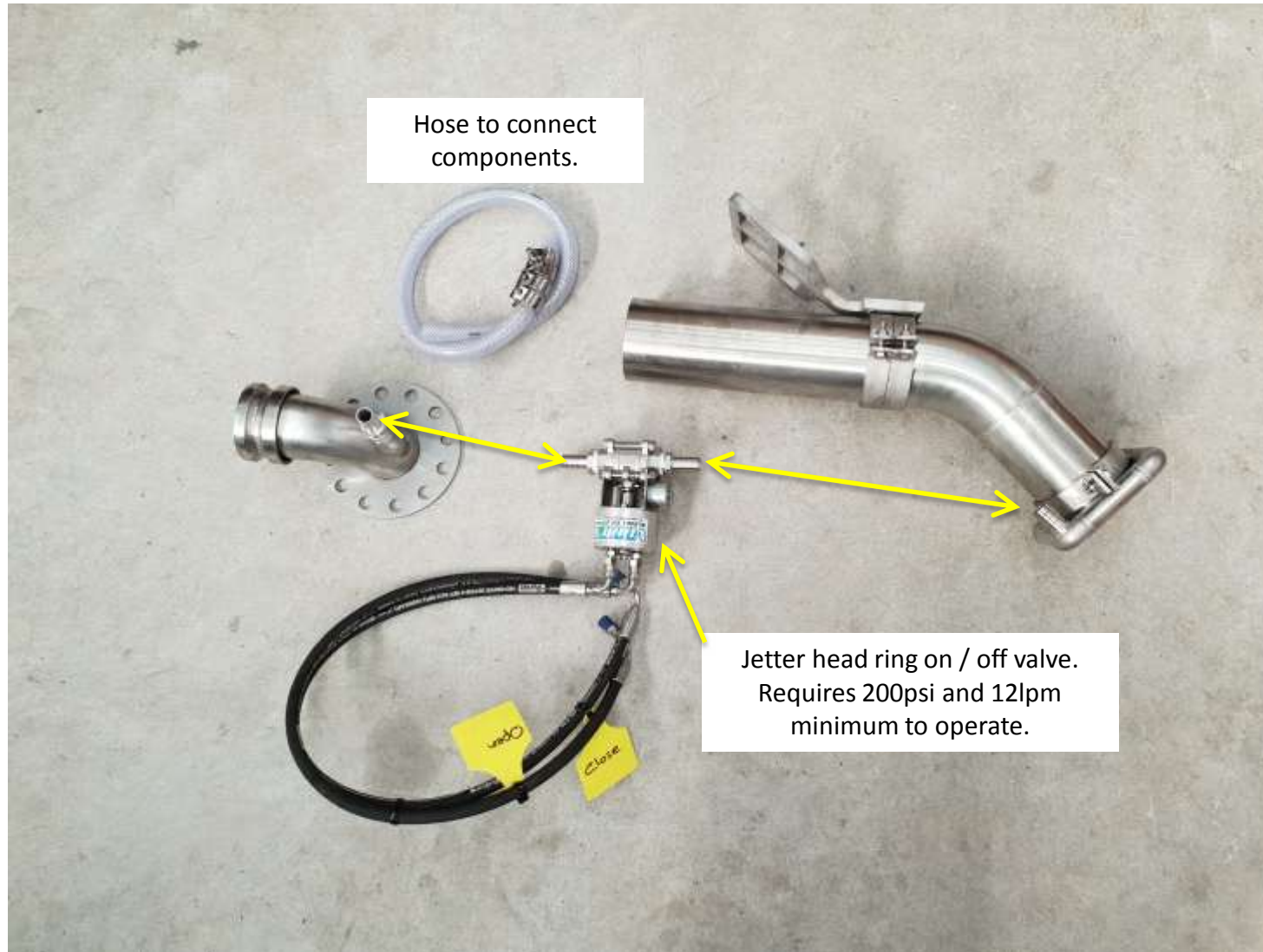
Connect reversal valve directly to exhaust of venturi as shown or remote mount the reversal valve at the end of an exhaust hose maximum 4 mtr long.

Direction of debris flow



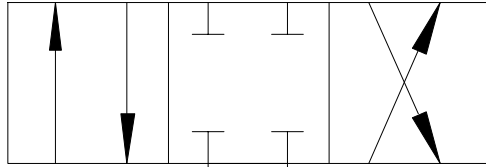
OPERATION – WATER JETTER RING

Water Jetter: Uses water taken from the water pump outlet and shown in tests not to affect dredge suction performance.
Water pressure available = 60psi (4.1bar) plus



OPERATION – HYDRAULIC CONNECTION TO ROV OR HPU

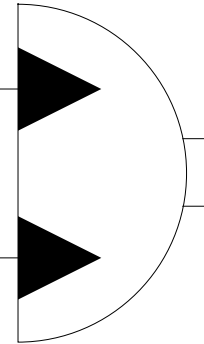
ROV hydraulic valve



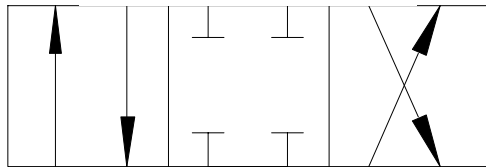
Reversal valve

200 psi and 12lpm minimum to operate

4mtr long, -4 jic female swivel end hoses.



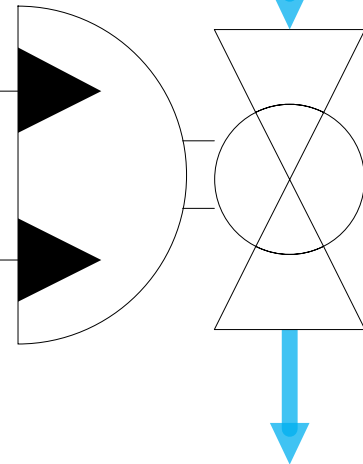
ROV hydraulic valve



Water jetter ring valve

200 psi and 12lpm minimum to operate

50mm long, -4 jic female swivel end hoses.



Inventory



A = Frame complete with electric motor, pump, "U" bend, compensators and Venturi.

B = ROV manipulator handle water jetter ring mounted on 4 inch stainless tube suction inlet.

C = Hydraulic operated ball valve with two x 500mm long hydraulic hoses with -4 jic male swivel fittings at each end for jetter ring water.

D = Spare venturi exhaust cone.

E = 4 mtr long water pump to remote mount Venturi hose with 3 inch female cam locks at each end.

F = One x 4 inch female cam lock to 4 inch hose tail for Exhaust hose.

G = One x 4 inch female cam lock to 4 inch hose tail for suction hose.

H = One x 4 inch male cam lock to 4 inch hose tail for Exhaust hose to reversal valve.

I = Reversal valve with two x 4 mtr long hydraulic hoses with -4 jic male swivel fittings at each end.

J = Water pump spares kit.

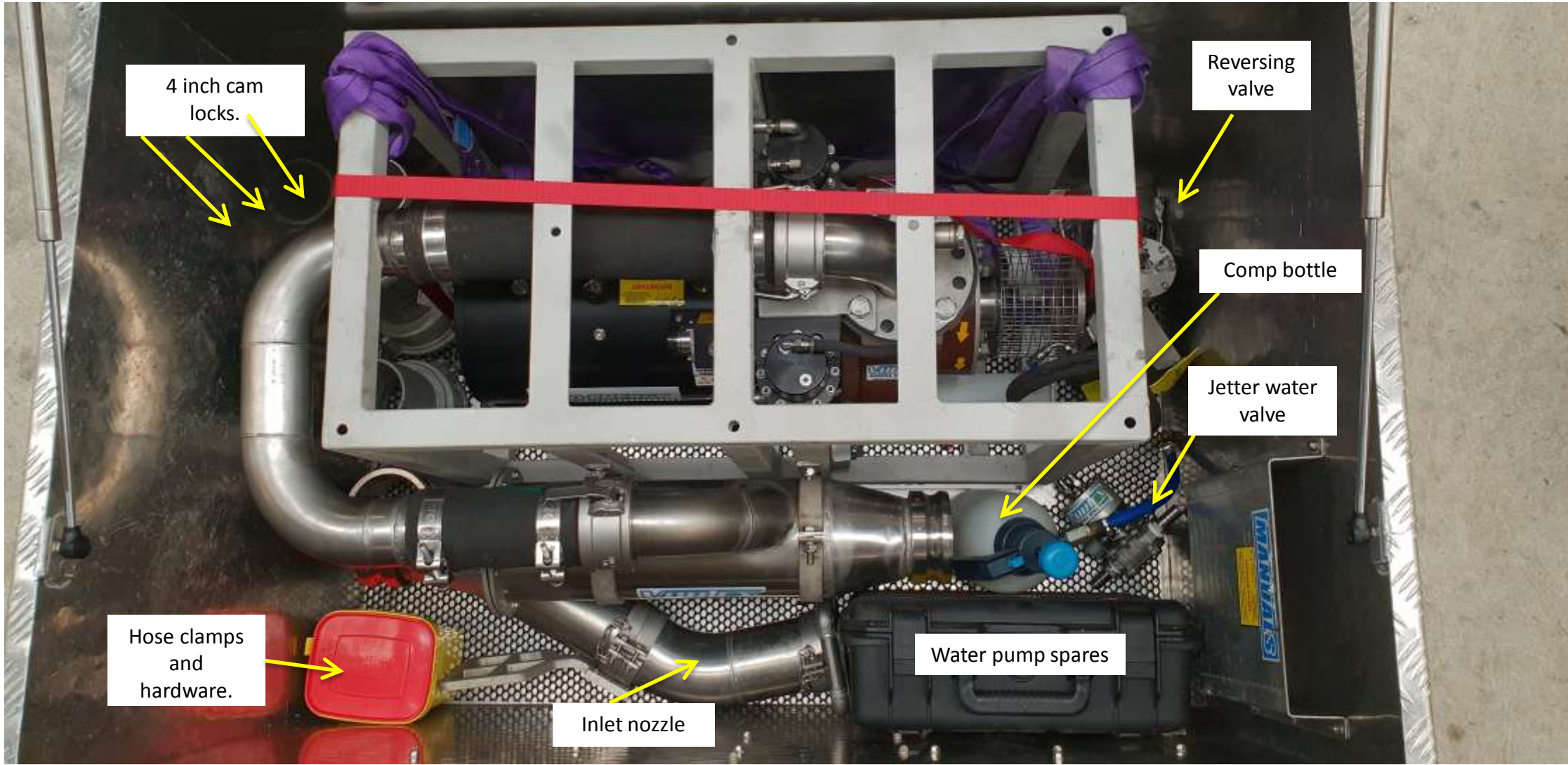
K = Three manuals.

L = Compensator filling bottle.

M = 5 mtr long 20mm hose with 4 x hose clamps for jetter kit.

PACKING SHIPPING BOX – STAGE 1

Inlet nozzle goes in first, then pump / frame set.



PACKING SHIPPING BOX – STAGE 2

3 inch hose goes in first, other hoses.

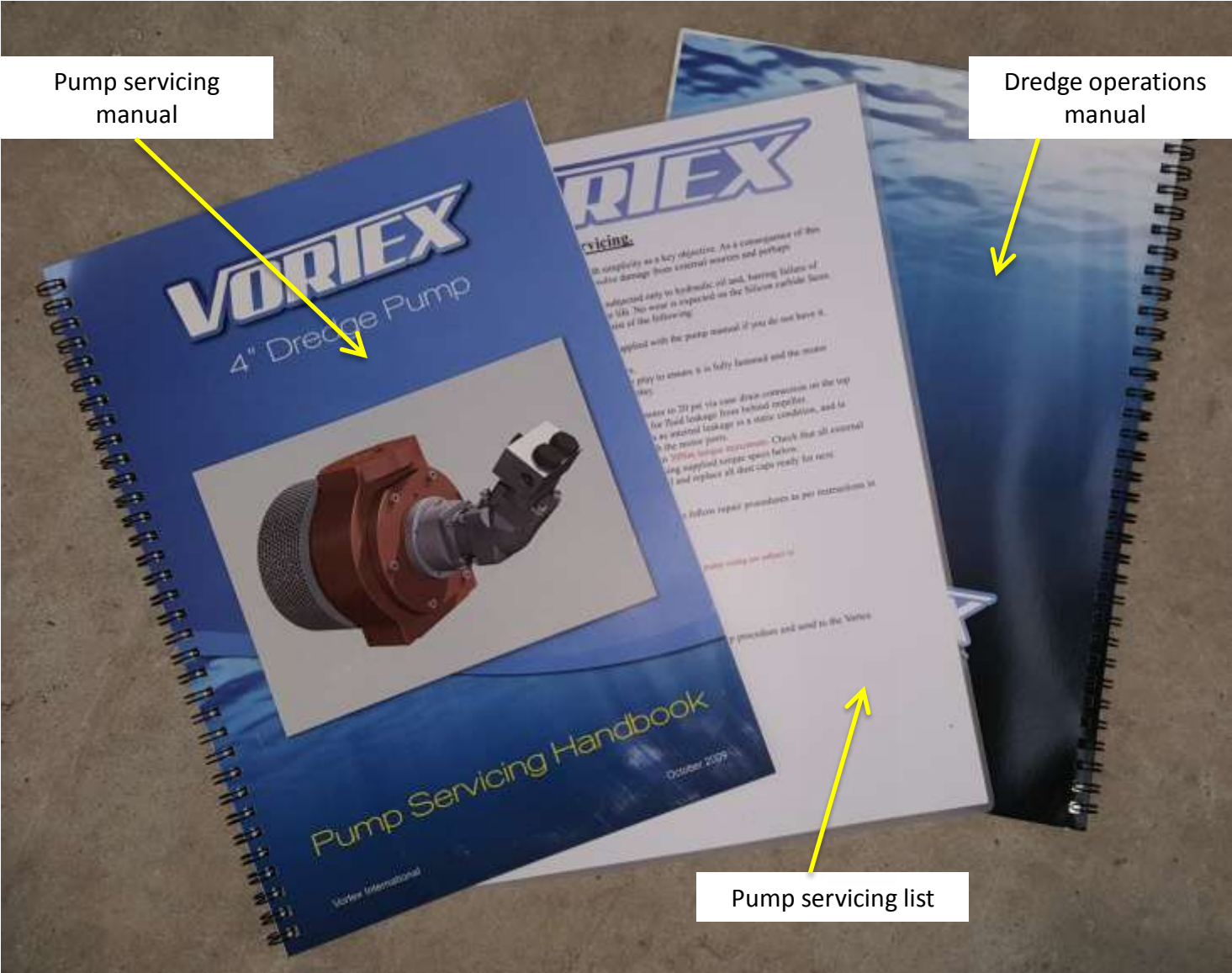
4 mtr long, -4 jic female swivel at each end, two hoses for reversal valve actuator.

4 mtr long, 3 inch water pump to Venturi hose used when pump not mounted in frame

5 mtr long, 20mm Jetter water valve hose

Manuals

MANUALS



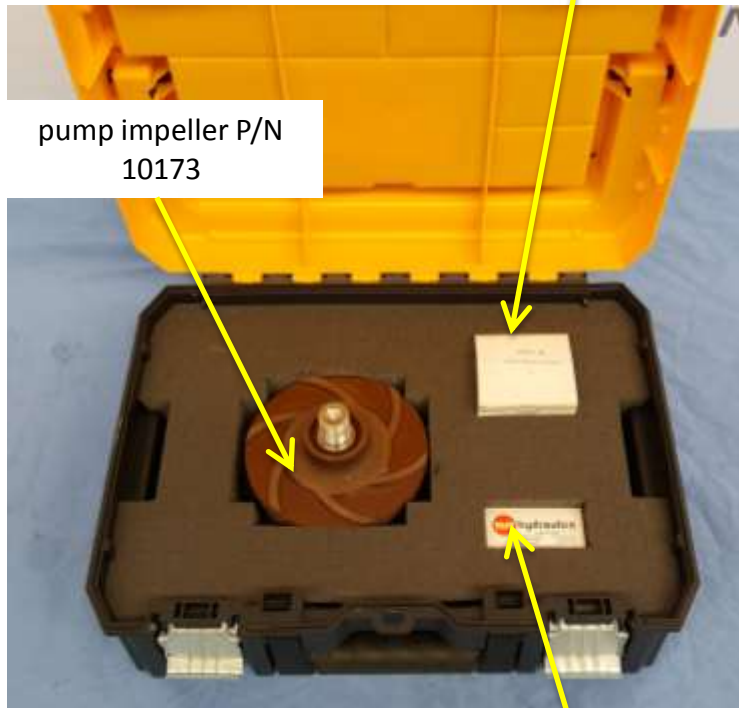
Pump servicing manual

Dredge operations manual

Pump servicing list

WATER PUMP SPARES

mech. seal rotor P/N 10185
mech. seal seat P/N 10180



pump impeller P/N 10173

SUN PO Check valve P/N CKGDXCN

Inlet hose hose-tail bolts. M8 x 25. 20 units.

o-ring P/N 10174
o-ring P/N 10178
o-ring P/N 10172
shim seal setting P/N 10200



1 1/4" to 3 inch C-Hook wrench

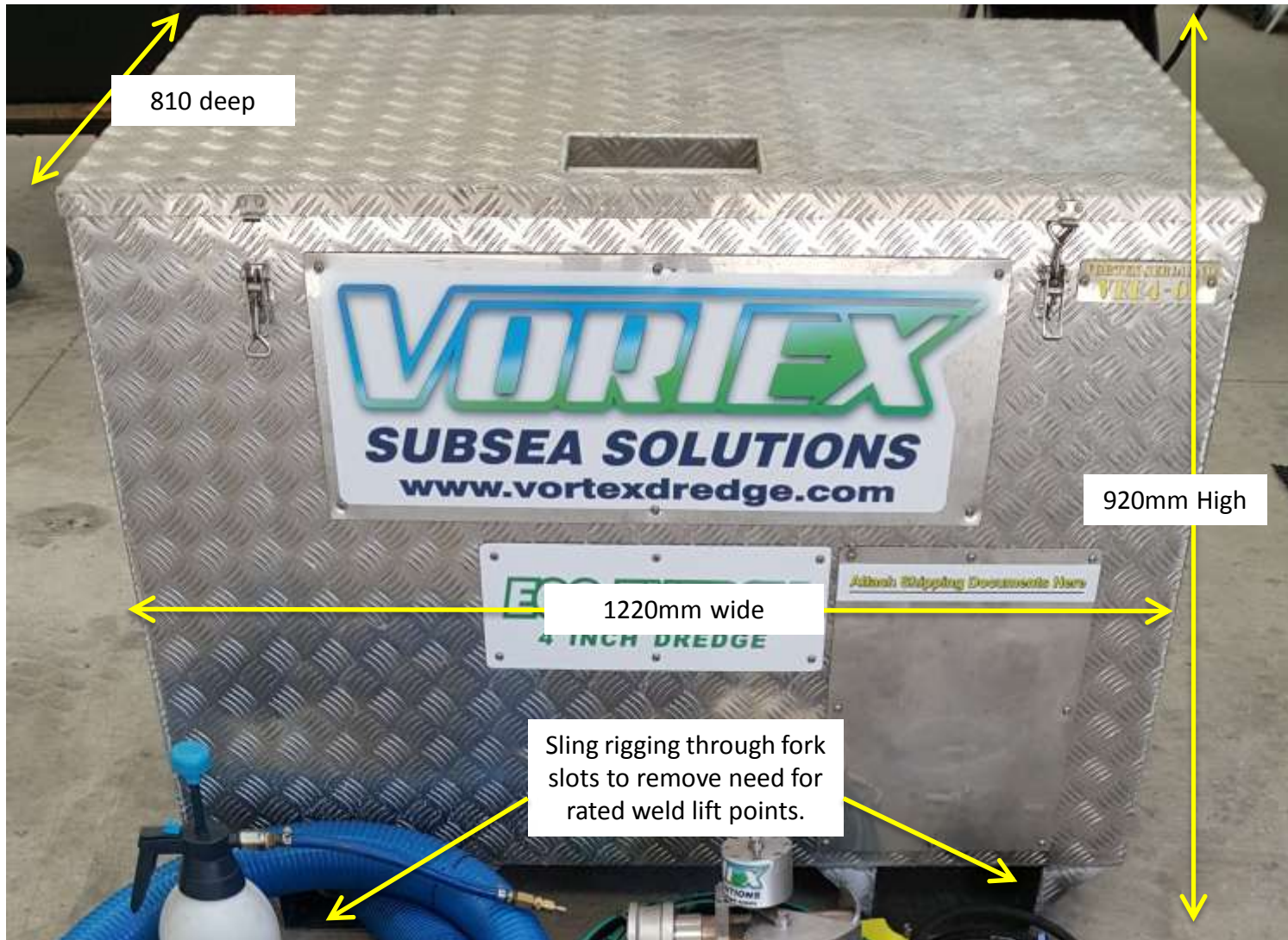
Reverse valve cyl spares

60 to 260mm chain wrench

M10 x 300mm longs/s shaft anchor bar.

SHIPPING BOX

- 1220mm wide x 920mm height x 810mm deep
- 265kg full kit in box



ACCESSORIES – OPTIONAL 6 INCH MARINE ROTARY HOE



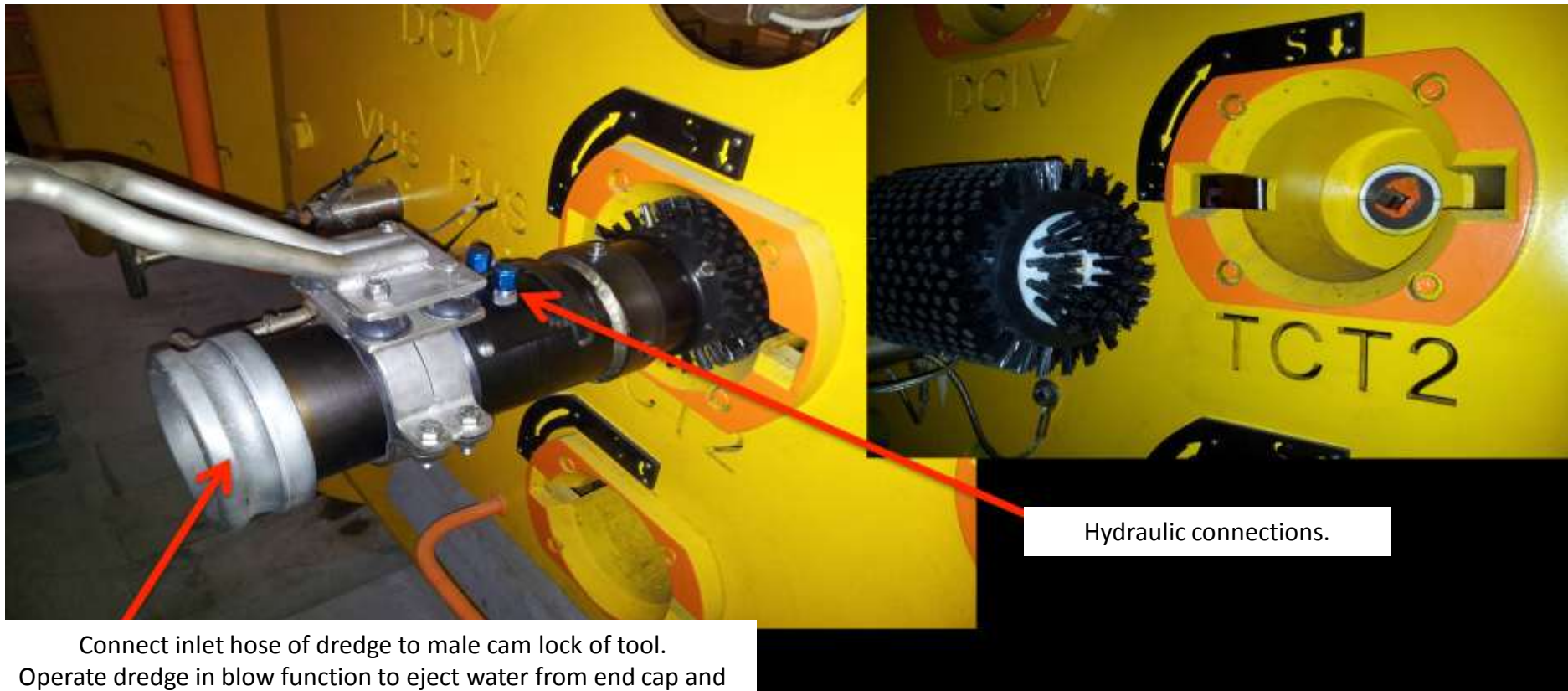
Another option for difficult soils is using the Vortex Marine Rotary Hoe. See images (left) of Marine Rotary Hoe. Sample videos available on our website.



Tested on 100 to 150 kPa rocks and clay. Designed for difficult soil conditions.

ACCESSORIES – OPTIONAL ROTARY BRUSH

- To be used in conjunction with Vortex reverse flow dredge or with Vortex water pump only as the motive water source.
- Water jets on four sides and front of Hydrate cleaning brush utilizing high volume water (62 m³/hr with Tornado pump) and up to 80 psi water pressure (with Tornado pump) generate severe turbulence to break up and disperse the hydrate build up with water pressure and flow.
- Mechanical action of bi-directional rotary brush serves to further break up hydrates. Soft bristles avoid damage to sensitive EFL and HFL assets.
- Connect inlet hose of dredge to male cam lock of tool.
- Operate dredge in blow function to eject water from end cap and sides of



Connect inlet hose of dredge to male cam lock of tool.
Operate dredge in blow function to eject water from end cap and sides of brush.

TROUBLE SHOOTING

Symptom: Water pump not operating

Remedy:

1. Check that pump is in correct rotation and change phase wires to correct.
2. Ensure that the hydraulic hoses are connected as per manual drawings and match connection labels.
3. Check any quick connect fittings you may have in the circuit as they can sometimes be faulty.
4. Has the water pump impeller been damaged by excessive silt or other dirt ingress? If so, please repair as necessary with accordance to supplied Vortex pump servicing handbook.

Symptom: Debris removal slow

Remedy:

1. Check the caged nozzle of inlet hose is not blocked. Stop hydraulic flow to water pump to allow rocks and debris to be cleared.
2. Check that all cam locks are fastened and secured correctly.
3. Check all cam lock O-rings are in place and in good condition.
4. Use steady and consistent movements when plunging suction hose inlet into seabed. Try side to side and up and down movements of suction hose inlet. Differing conditions may require changing methods.
5. Check all hydraulic remedies as seen in “water pump not operating” section of trouble shooting.
6. Check inlet and exhaust hoses are not bent or blocked.

CONTACTS

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