

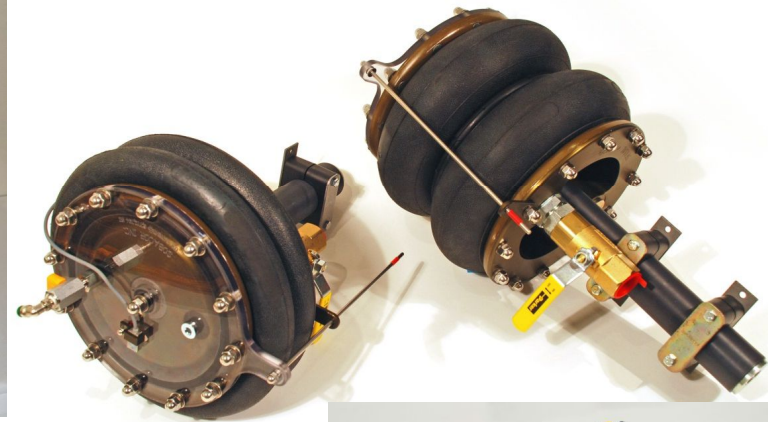
# Variable Volume Reservoir

Smart  
Reservoir

[www.smartreservoir.com](http://www.smartreservoir.com)



US Patent 6,772,794 B2



**Are you looking for special features in a hydraulic reservoir?**

**Would you like to:**

- Have an ecological footprint and use bio fluid but the cost of filling your large reservoir and to be green for the environment is stopping you?
- Considerably reduce the weight of your fully filled reservoir to a bare minimum?
- Cease using a large footprint and be able to reduce this space to a minimum?
- Reduce maintenance cost with a sealed reservoir that eliminates the particles & moisture ingestion instead of sustaining a reservoir exposed to various contaminants?
- Be able to place the reservoir anywhere in place of a cumbersome overhead tank or "L" shape configuration?
- Be able to operate in high altitude or under water with a reservoir suitable for the application?

**The VVR is the solution for you.**



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The VVR technology is an innovative concept derived from the aerospace “bootstrap” reservoir design. Its purpose is to replace on selected applications the “classic” atmospheric reservoir (tank). The VVR mostly targets industrial, mobile, military, marine and offshore fluid power systems. It can be from open loop systems to hydrostatic drives.

In conventional systems, the reservoir oil capacity is sized in relation to the pump flow rate (typically 2-3 times) whereas the VVR solution requires to size from the system oil displacement and thermal expansion. Displacement could be from differential cylinders where the rod volume only must be accounted for .

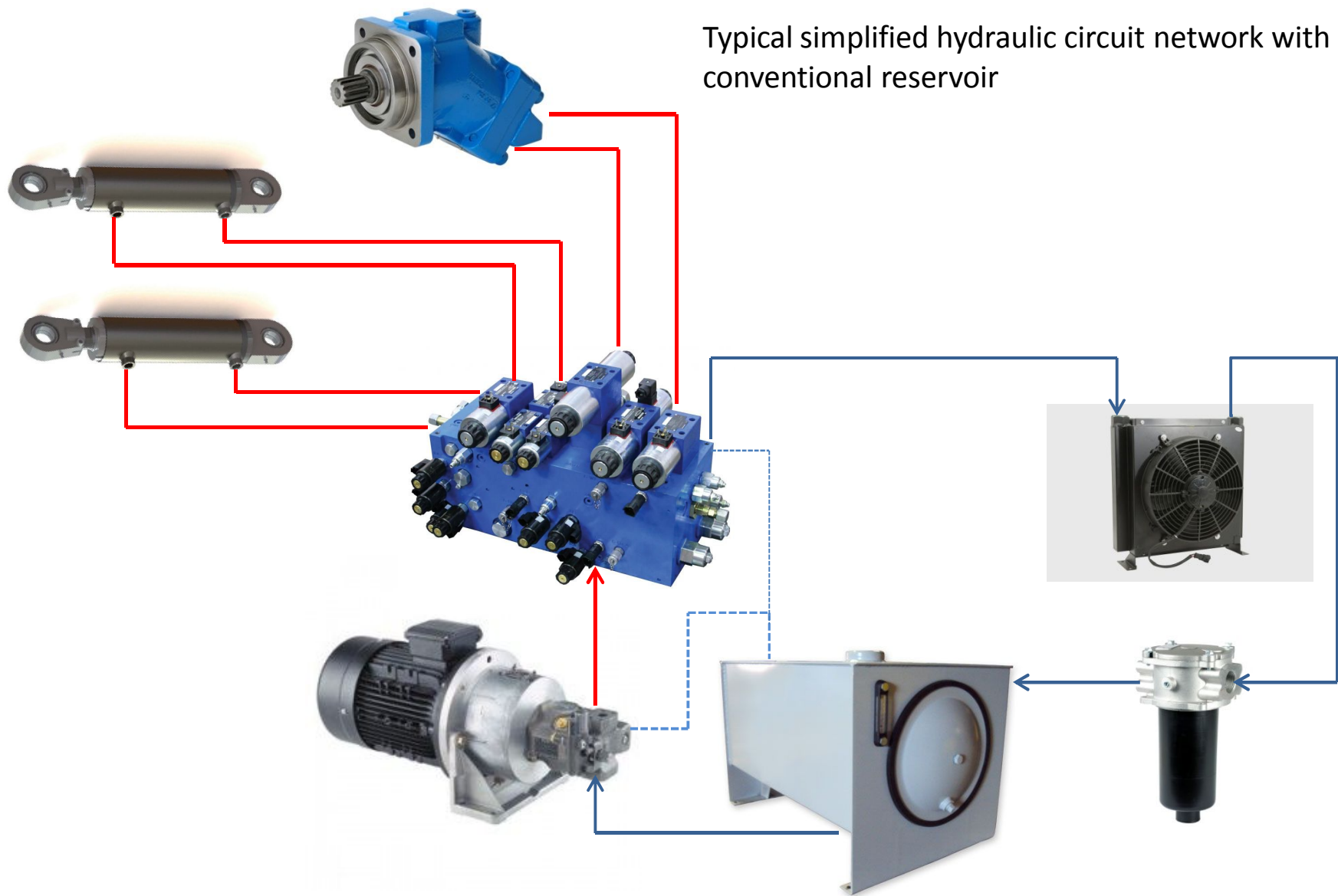
Main return flow goes direct to pump inlet where the VVR connected to the return line will compensate for volume differential and thermal expansion, thus making the VVR totally independent from system flow.

The VVR is not part of the cooling equation; hence, classic reservoir offers very poor cooling capacity. It is in our philosophy that the coolers must provide **100% if this task**. Why use a bulky heavy mass of fluid to obtain the same result...

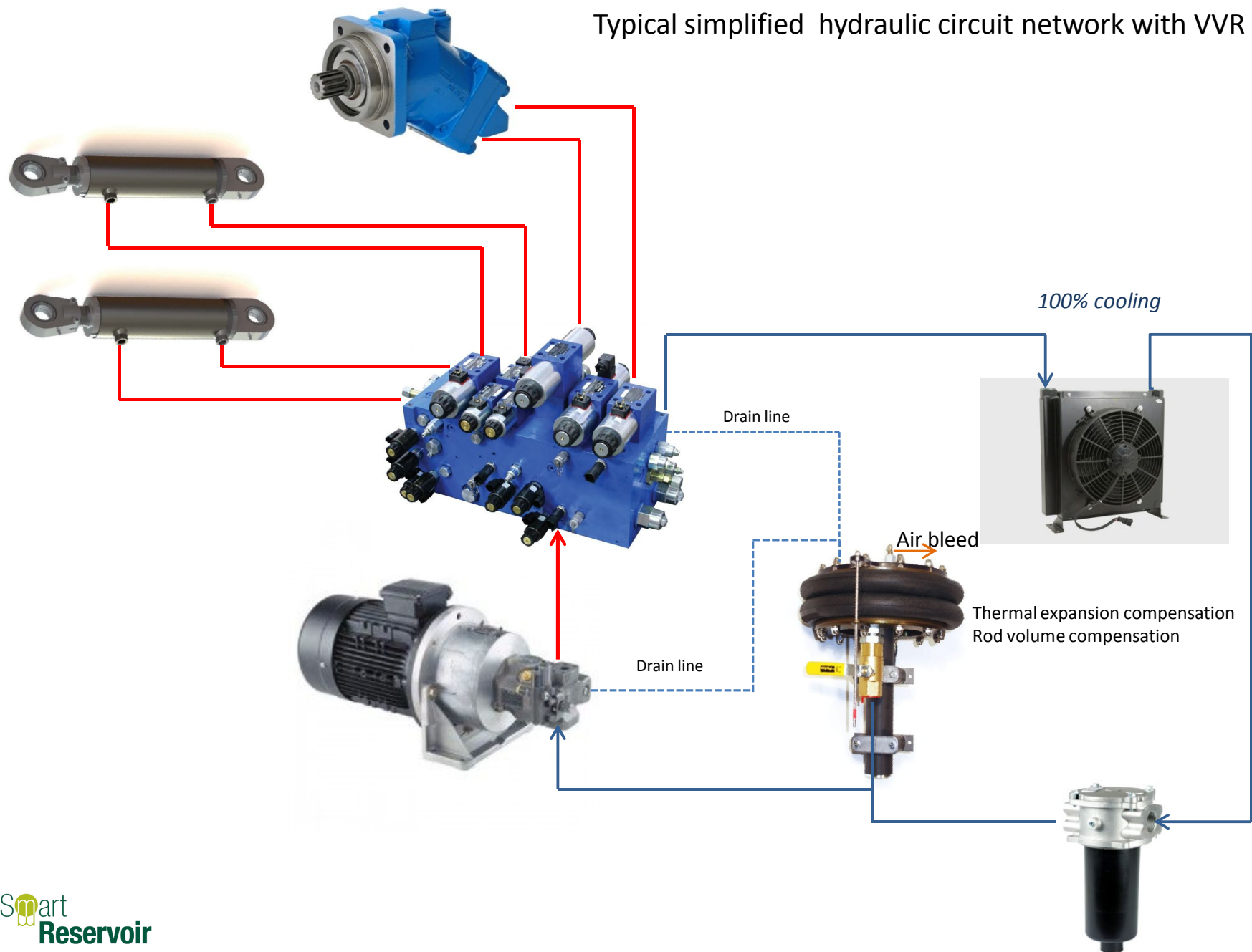
The VVR is a sealed airless slightly pressurized device that offers many benefits; 1 to 8 PSID / ,07 to 0,5 bar

- Considerable weight reduction (up to 100 times)
  - Considerable space reduction
  - Reduced fluid cost
  - Environment friendly and mostly suitable for biodegradable fluids
  - Open loop system becomes a closed loop system
  - Exposure to solid contaminants and moisture (oxidation) is eliminated
  - Increased fluid and components life thus lower maintenance cost and increased system reliability
  - Reduced contamination risk when filling
  - Reduced oil disposal volume / recycling
  - Reduced fire hazards and consequences
  - Reduced decontamination cost if a major leak occurs
  - Pump positive inlet pressure allows machine to operate in any orientation and altitude
  - Pump positive inlet pressure reduces pump noise and allows for better performance and increased speed
  - VVR's can be installed in series or parallel to increase effective volume
  - VVR's can be installed on independent pump to isolate circuits
- Two sizes: **400 in<sup>3</sup> / 6,6 l** or **800 in<sup>3</sup> / 14 l** displacements with many options available

Typical simplified hydraulic circuit network with conventional reservoir



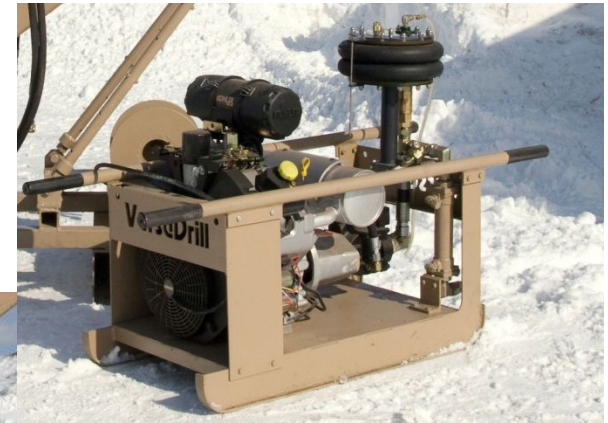
Typical simplified hydraulic circuit network with VVR







## Heli-portable drills



KmA .3  
900 ft capacity



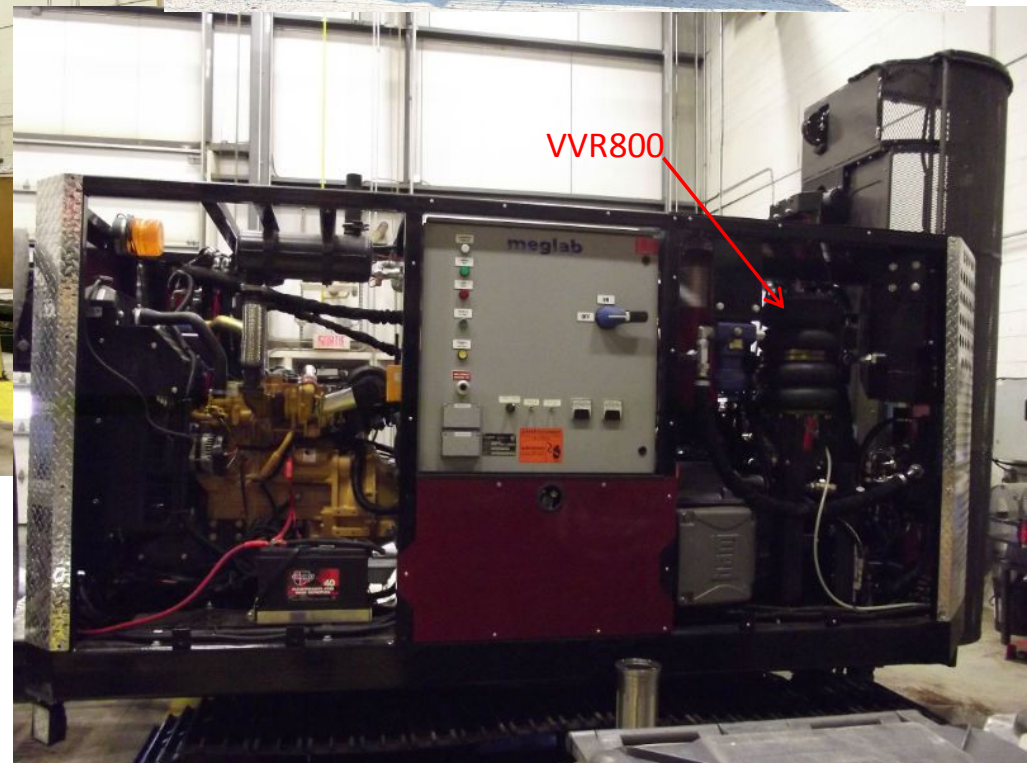
## KmN.6H

Heli-portable drill  
2000 ft capacity

Twin diesel / VVR HPU's



Larger drill rigs ...

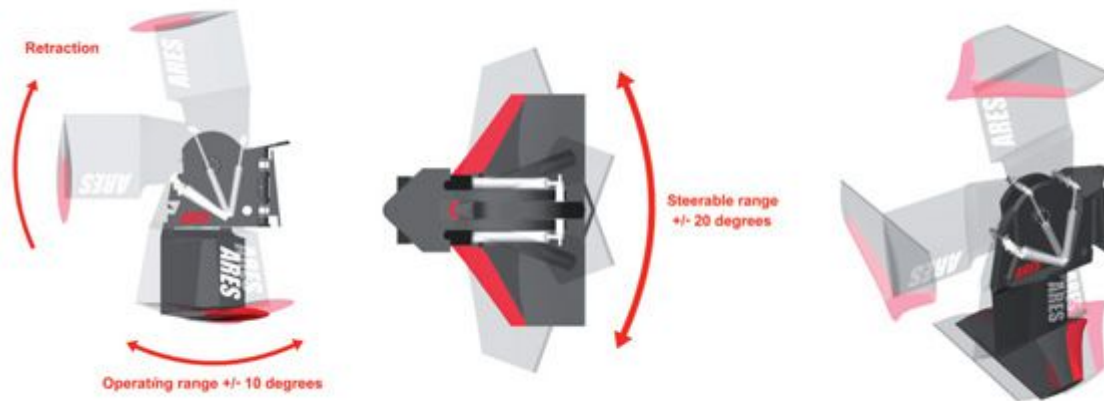




US NAVY express crew boat



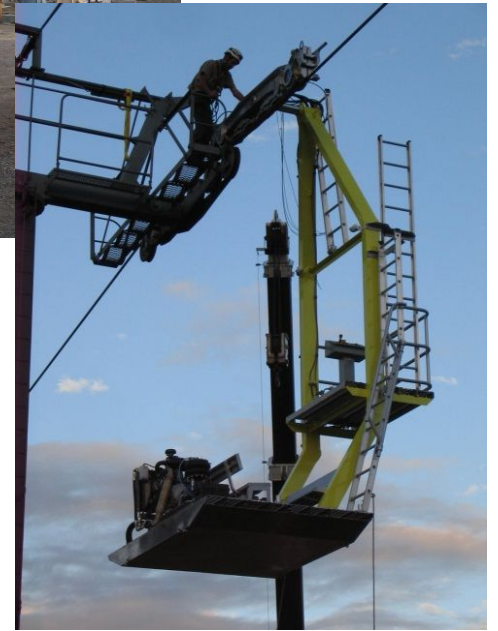
**ARES**  
Adaptive ride  
Enhancement system  
Use VVR for actuators HPU



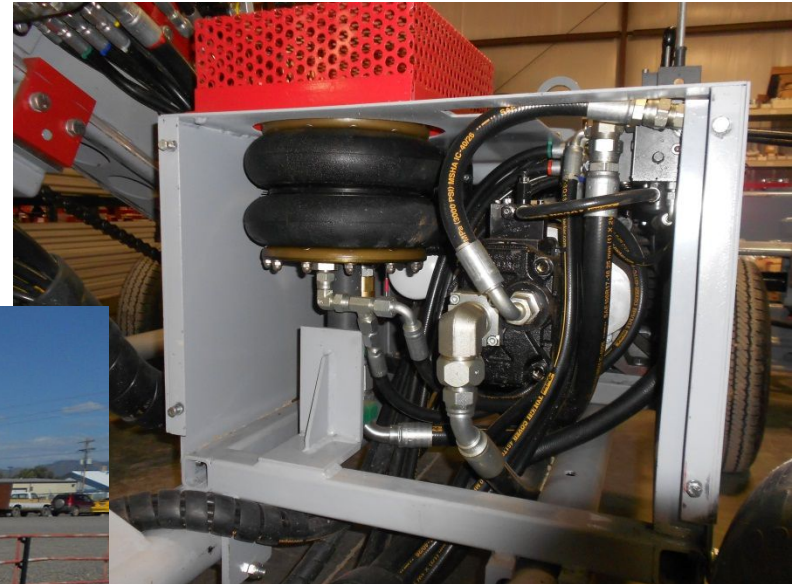
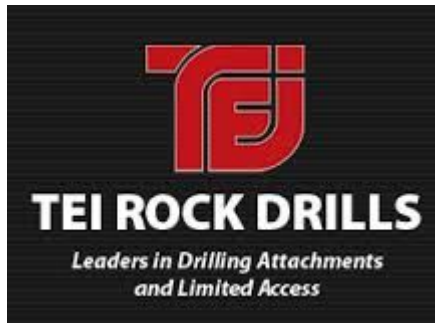




POMABUS Ropeway rescue vehicle



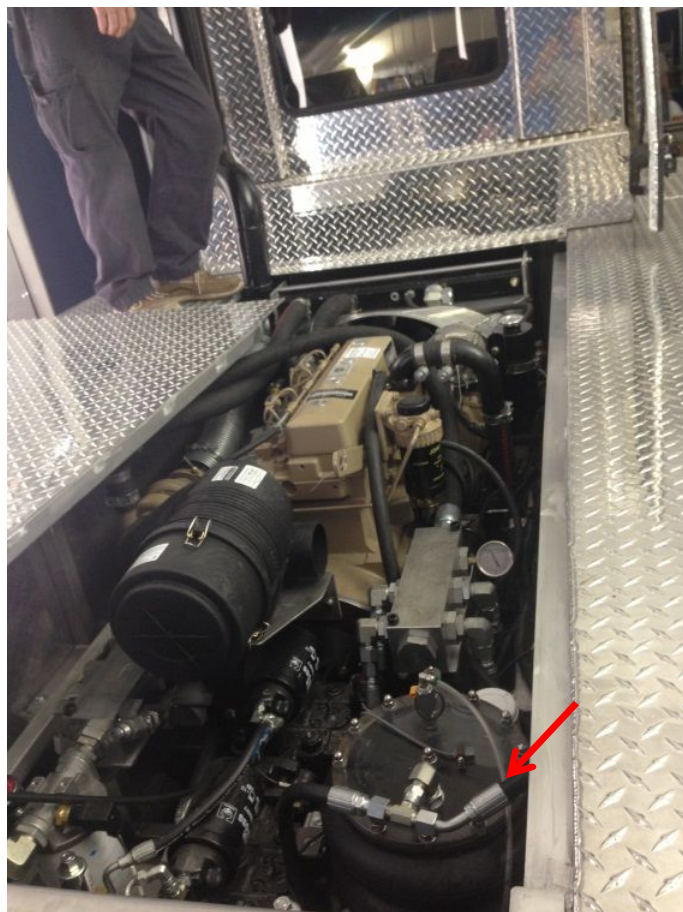








Diesel /hydrostatic drives  
Multi task Track utility vehicle

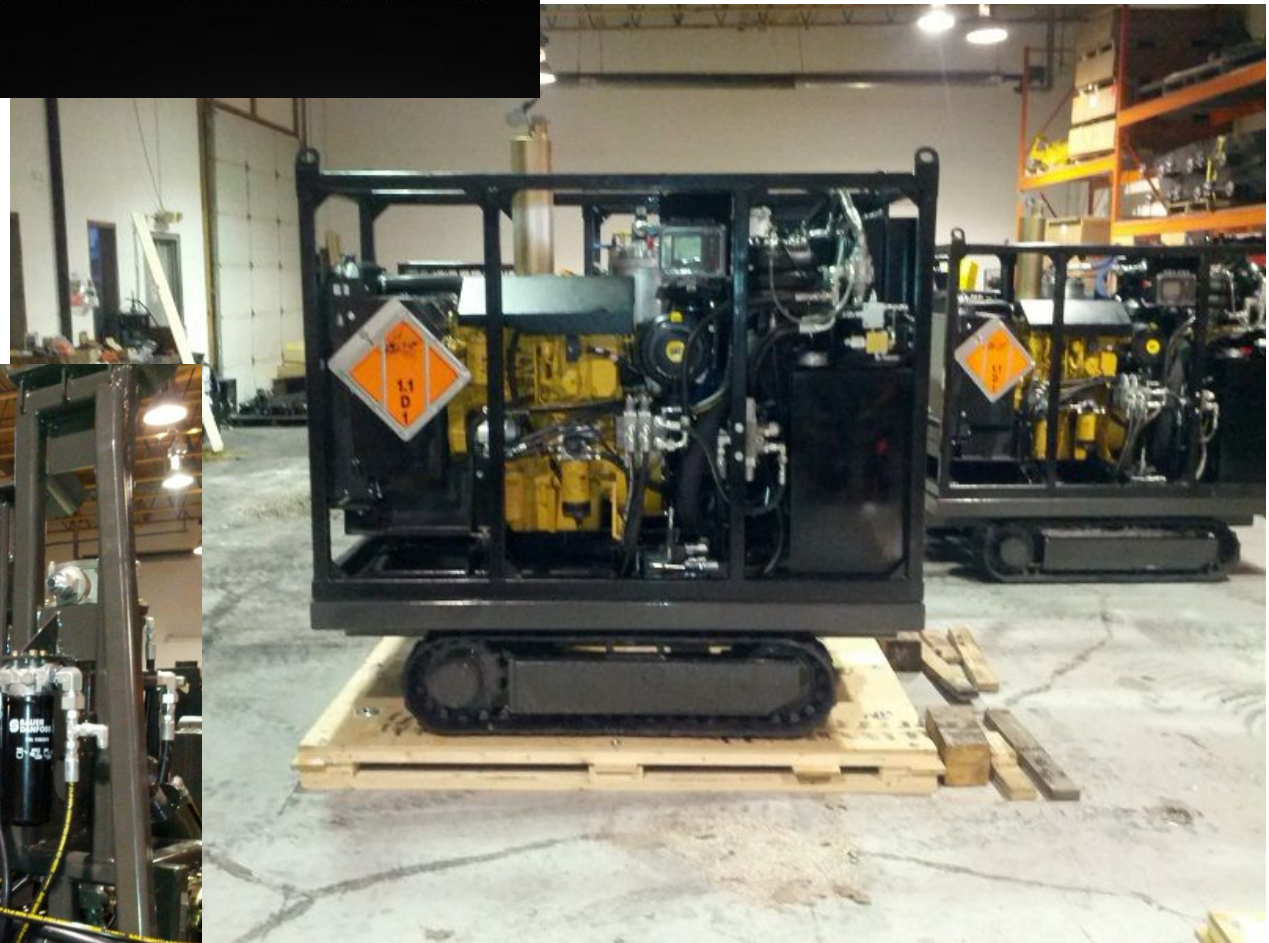
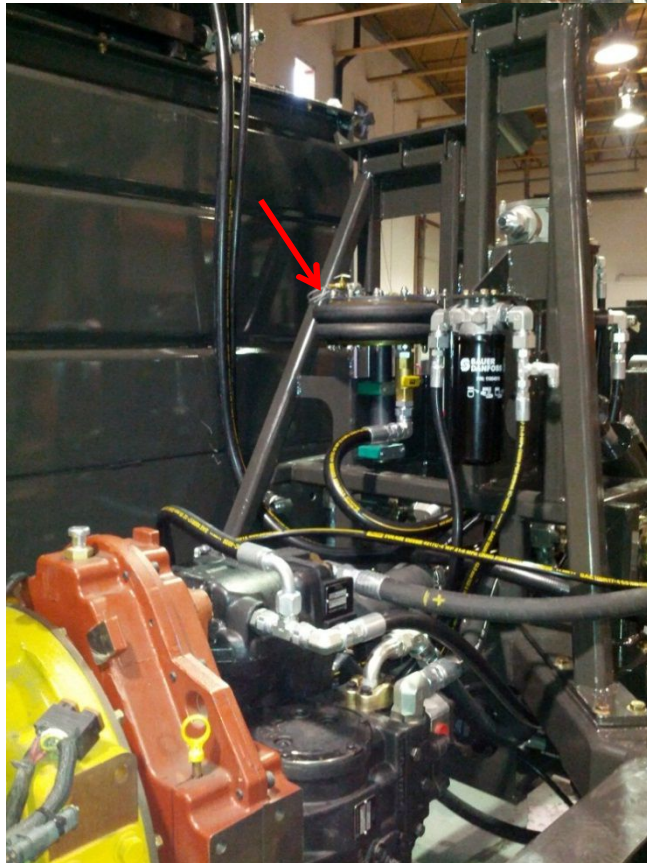








ABSOLUTE-NORTH DRILLING SOLUTIONS INC.



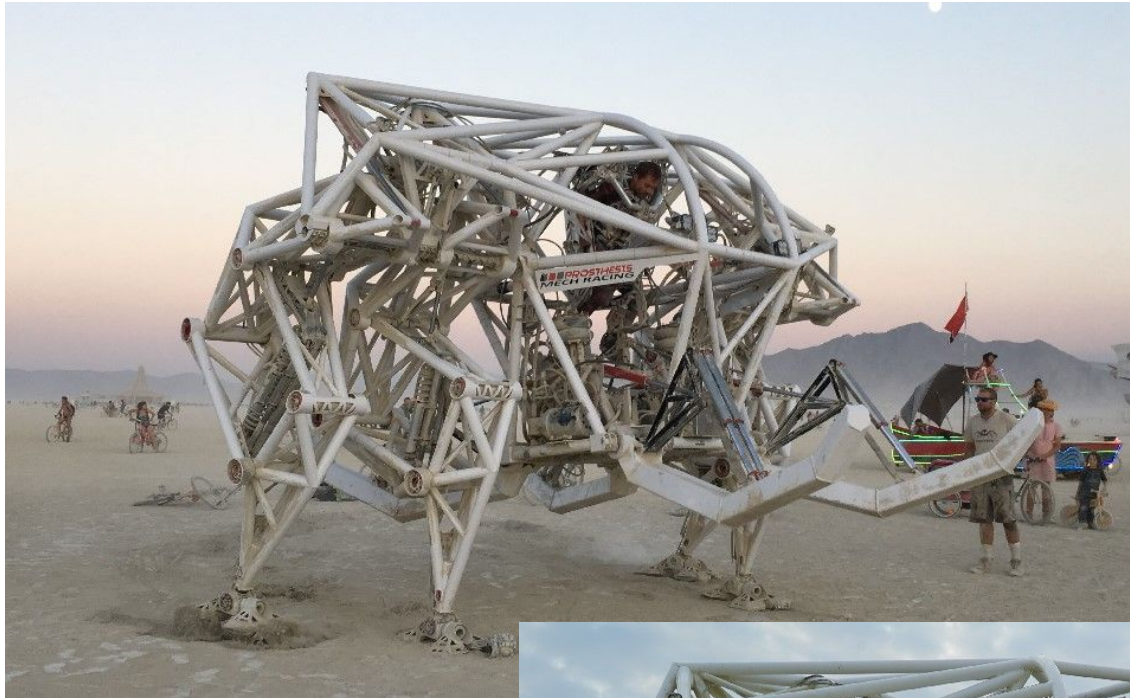


Jeff Friesen

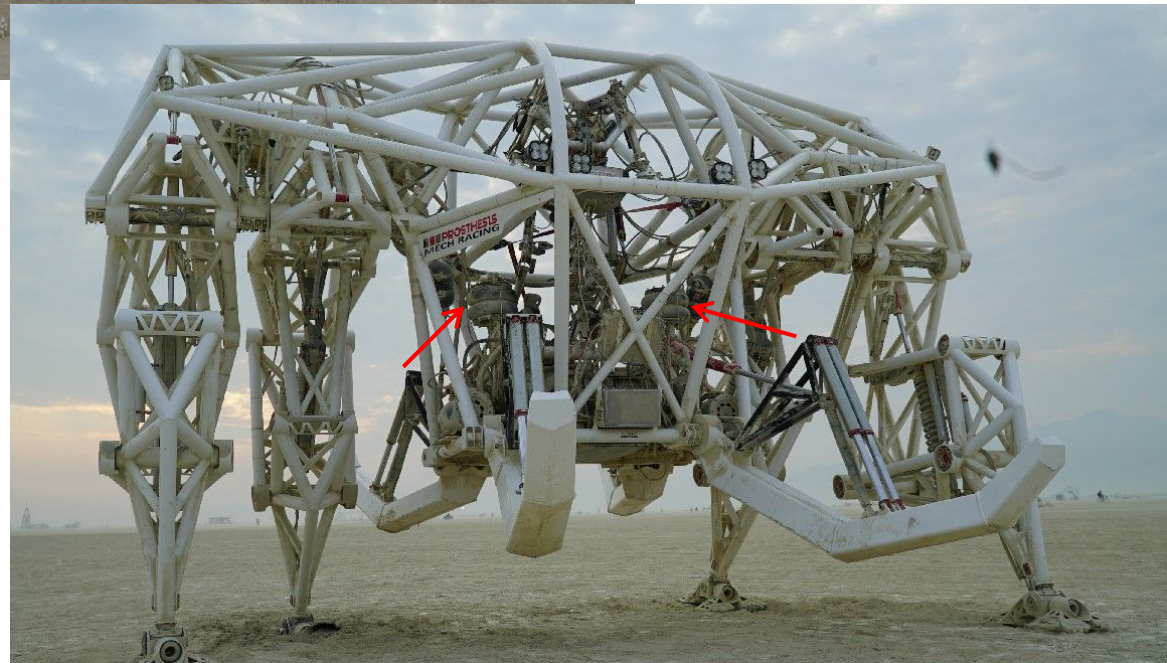
HydroDynamic V8 AWD ATV







Furrier Exo-Bionics Prosthesis  
Human controlled mobility platform  
200HP DC HPU using 2 x VVR400



# Built by Well Drillers for Well Drillers



360-477-0251

Mudslayer 750



Mudslayer 500



Mudslayer 250

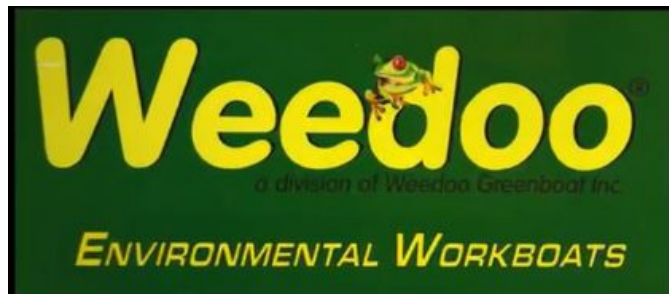




# Residue Solutions **MUDMASTER**











## Military applications

Power steering and brake system

Radiator fan hydraulic motor

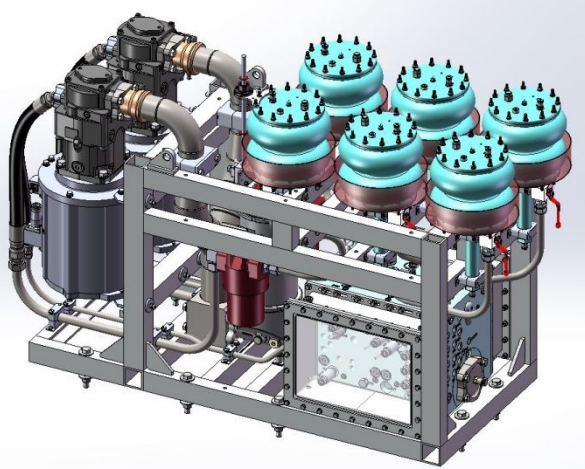
Rear entry door hydraulic actuators







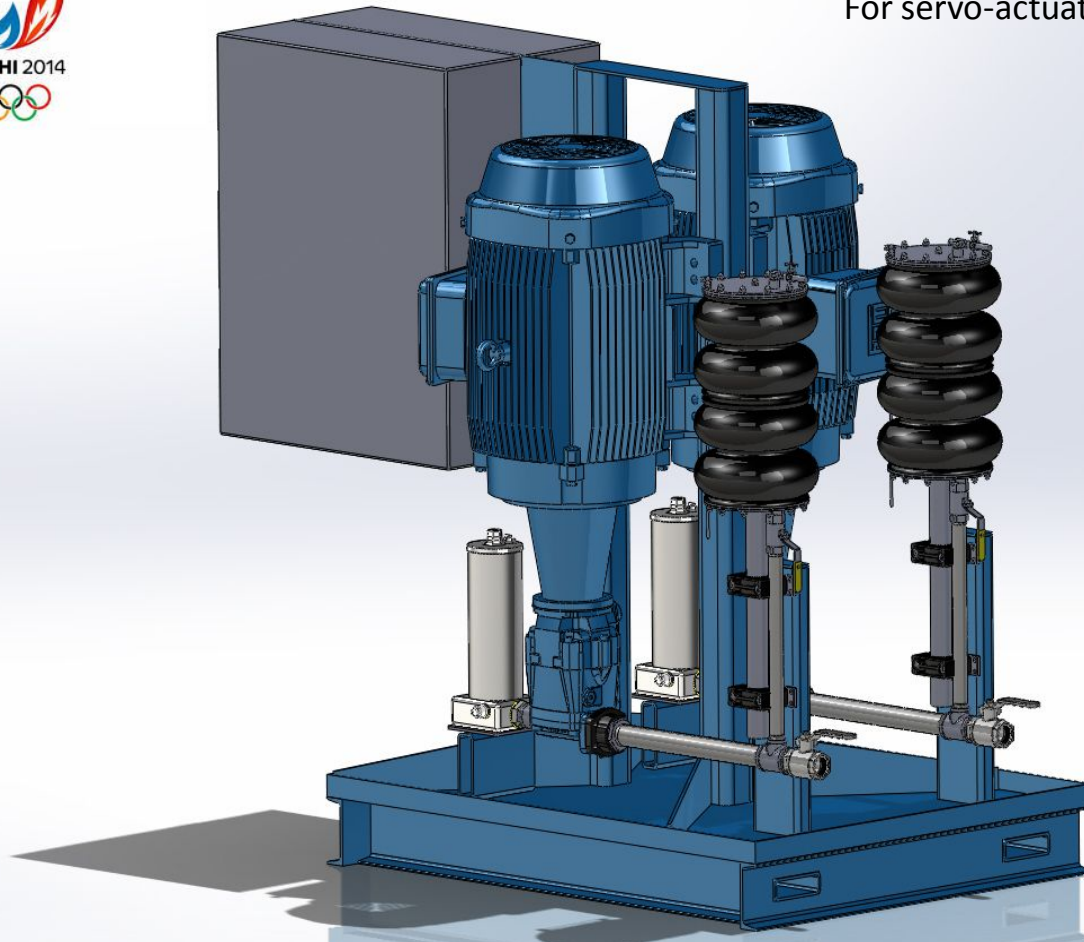
Subsea drills & excavators (CRD100 subsea seafloor drill)

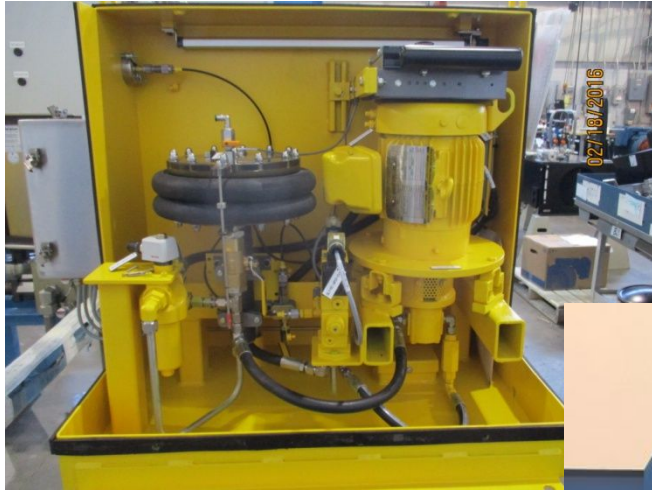






Twin 125HP HPU with VVR800's  
For servo-actuators multi stage lifting





**Rexroth**  
Bosch Group

Bosch Rexroth Canada BC industrial HPU's



Smart  
Reservoir



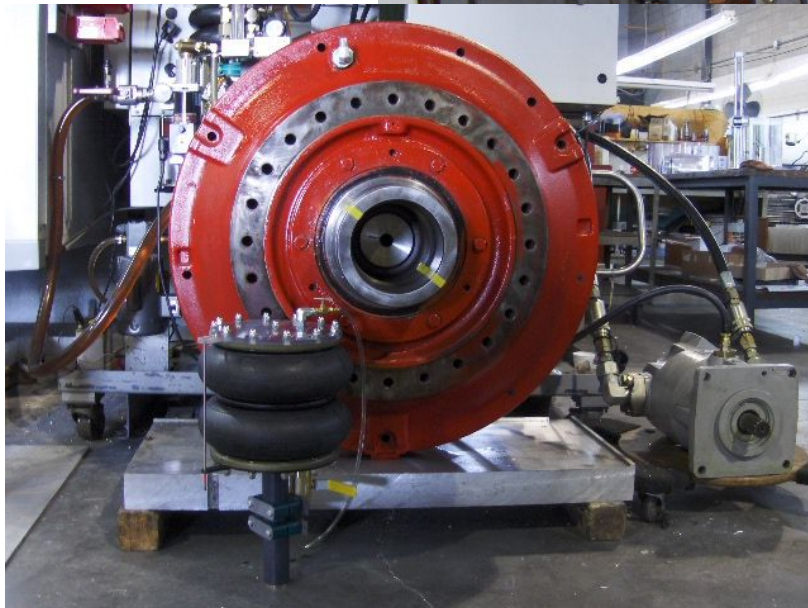
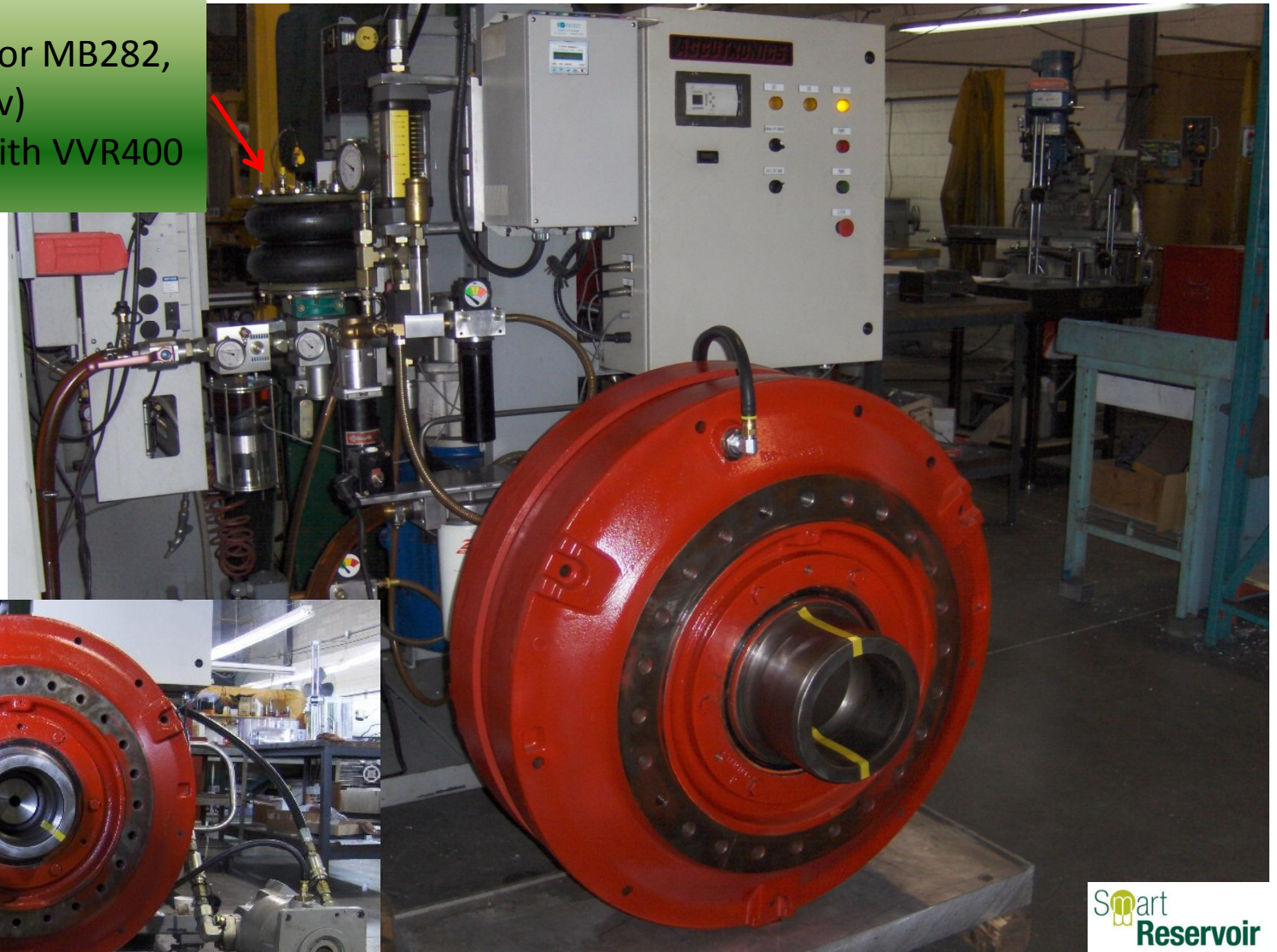


Auxiliary HPU





Hagglund's motor MB282,  
1037cc (18 L/rev)  
On test stand with VVR400



Any drive system can use the VVR400 or VVR800  
It is a matter of fluid thermal expansion volume...  
→ They can be used in series or parallel to increase volume



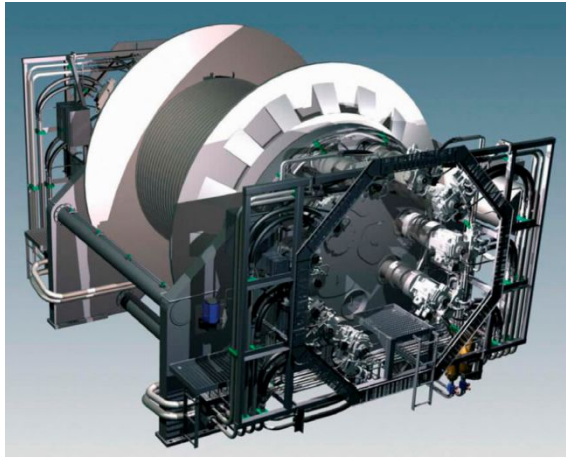
## VVR Business potential

Various drill rigs ...





## Winch drives ...



HYJ6-140-135-26-ZPL

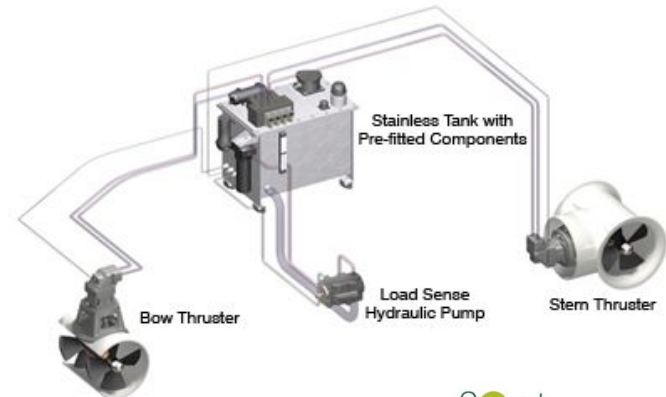




## Marine propulsion; Bow, pod & azimuth thrusters ...



SCHOTTEL SRP 4000



## Marine hydraulic vertical capstan





## Various utility track vehicles



## Snow removal





## Inching drives

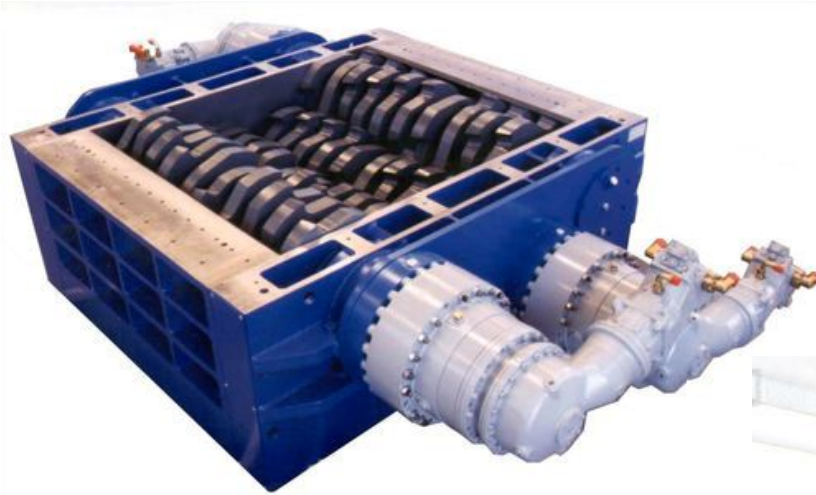


Various mining & mills drive ...





## Various material shredders



Various drives ...



Rotary actuators ...





## Variable Volume Reservoir, Fluid Power Application

Carl Seguin  
Pierrefonds, Quebec  
Canada

Views: 3492  
Votes: 94

Machinery & Equipment  
May 19, 2011



The Variable Volume Reservoir (VVR) was designed around the common aerospace Bootstrap reservoir used on aircraft. The VVR design is much simpler in design and cost effective. It was designed to target the industrial hydraulic machinery sector (mobile and stationary). The main purpose is to replace the common hydraulic reservoirs where most of the time is sized too large for the application. The common rule of thumb in the industrial market for reservoir size is 2-3 times the pump flow where the VVR volume is ONLY based on thermal fluid expansion and cylinder rod volume (if applicable). In some applications the 6.6litres (400 cu.in.) VVR could replace a 400-900+ litres reservoir. This represents significant fluid volume reduction, less fluid to recycle, less space and a weight reduction of 550-1800+ Kg. The significant weight reduction could represent fuel economy for 'on the road' vehicles. In general the VVR will reduce the fluid volume by a factor of 100 and weight by 200. If required, two VVR's could be installed in series or parallel to increase volume or to isolate pumps circuit network. To state an example the large hydraulic motor shown on the lower picture (18L/rev) would normally require a 300 to 800 liters standard reservoir depending on the pump flow, where has the 6.6 L VVR will assure the same performance (and better) regardless of pump flow. The field of applications are many ...



### VOTING

Voting is closed!

### TAGS

Agriculture, Manufacturing, Mobile, Vehicles,

### ABOUT THE ENTRANT

**Name:** Carl Seguin

**Type of entry:** team

**Team members:**

Carl Seguin

Rene Gauthier

Claudio Bazzarelli

**Profession:** Engineer/Designer

**Number of times previously entering contest:** never

**Carl's hobbies and activities:**

Self improvement, various sports and marathons

**Carl is inspired by:**

Environment, Saving oil & fuel, weight, space, carbon credits

**Software used for this entry:**

MasterCam, AutoCad, Catia

**Patent status:** patented

### VIEW ENTRIES BY

#### CONTEST CATEGORY

Aerospace & Defense

Automotive/Transportation

Consumer Products

Electronics

Machinery/Automation/Robotics

Medical

Sustainable Technologies

#### TAGS

Tag Cloud

#### ENTRANT'S PROFILE

2015 Entrants

#### RESULTS

Number of votes

Number of page views

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