

# COMPACT POWER UNIT with Cyclone (CPU)

*Saving space, money and the environment!*

# CPU – Features and Benefits

- Radically downscaled oil tank and thus oil volume
  - *Considerable savings both on weight and required space*
- Reduced environmental impact
  - *Oil volume in the tank can be reduced by more than 80% compared to conventional systems*
- Simple and solid
  - *Robust design with high reliability – no moving parts*
- Economical
  - *Initial purchase of oil to be significant reduced*
  - *Cost savings as a consequence of smaller unit and lower weight*
- Forced deaeration of oil
  - *Significantly increased deaeration of oil compared to conventional oil tanks*

## CPU - limitations

- The delta oil volume in the oil tank has to be calculated and within the oil tank's total capacity
- Return flow to the CPU can't at any time be less than appr. 2/3 of the actual pump flow (related to cylinders with a high differential volume in/out)

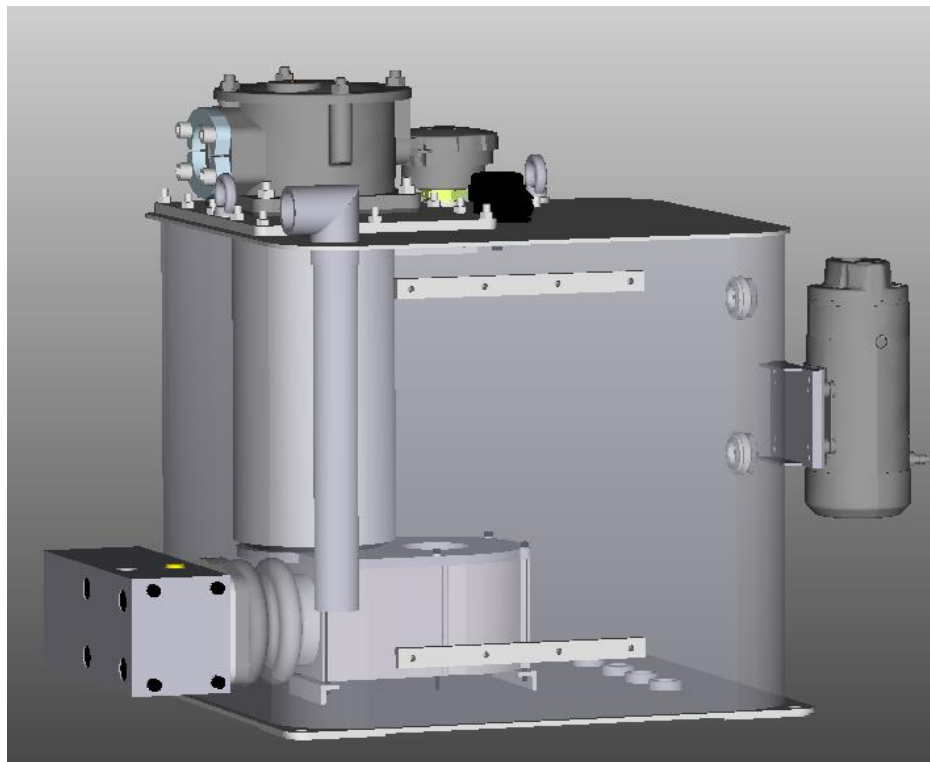
# Cyclone element

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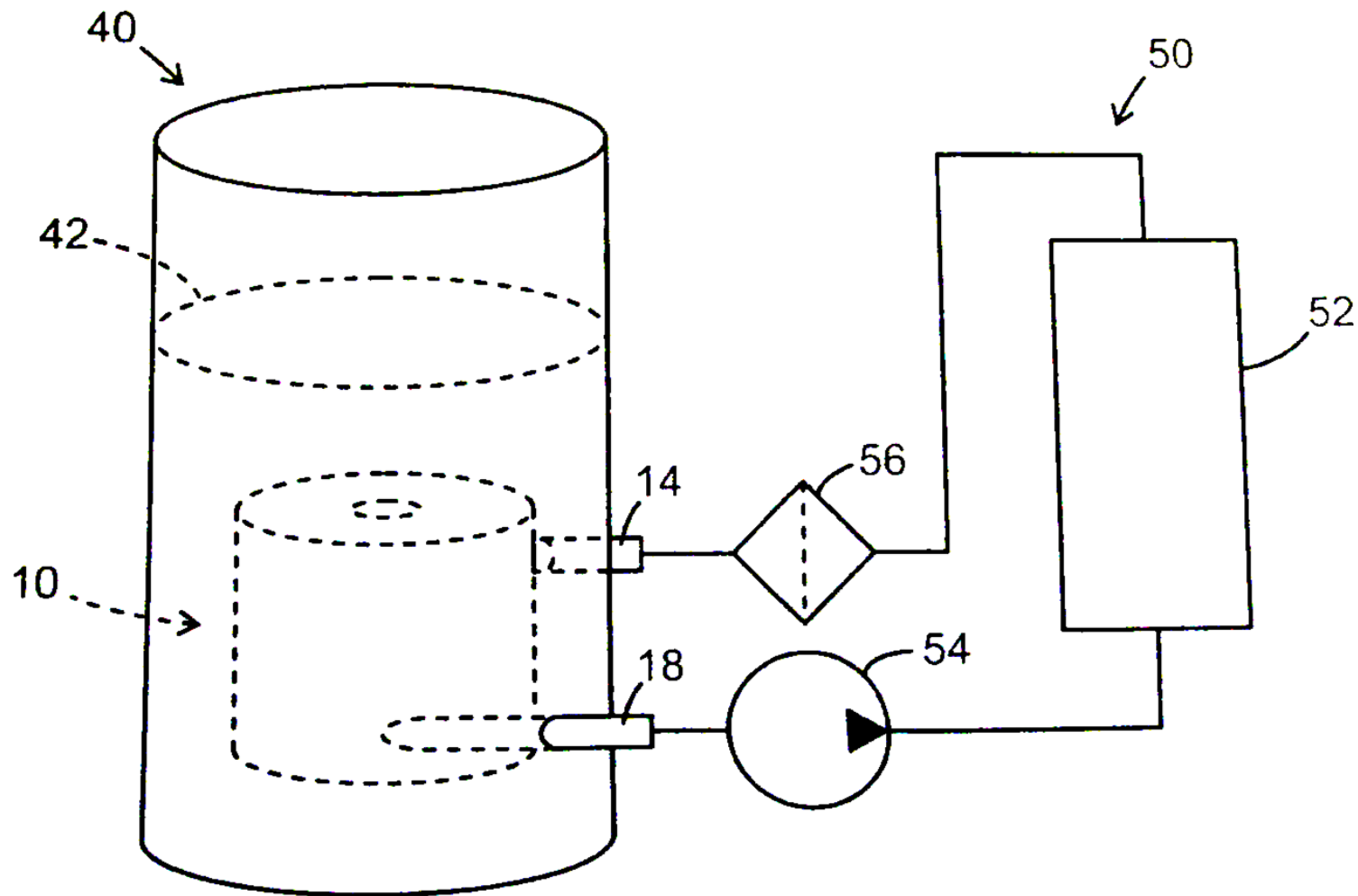
Cyclone element



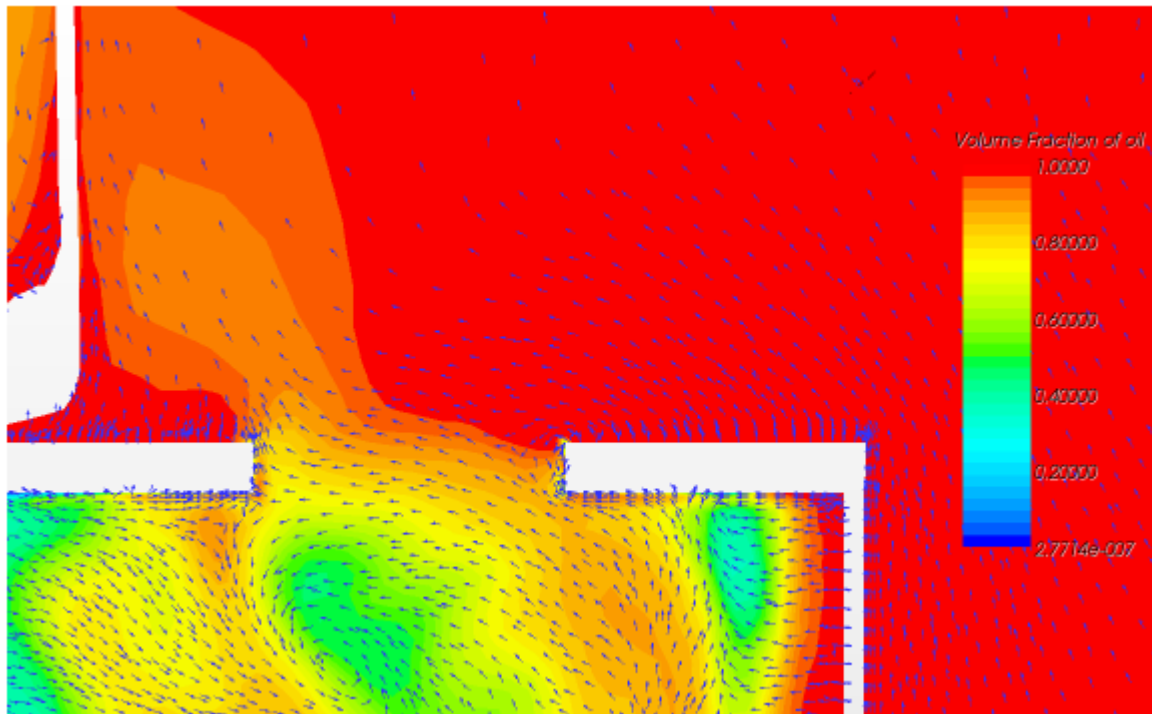
Cyclone in tank



# Cyclone principle



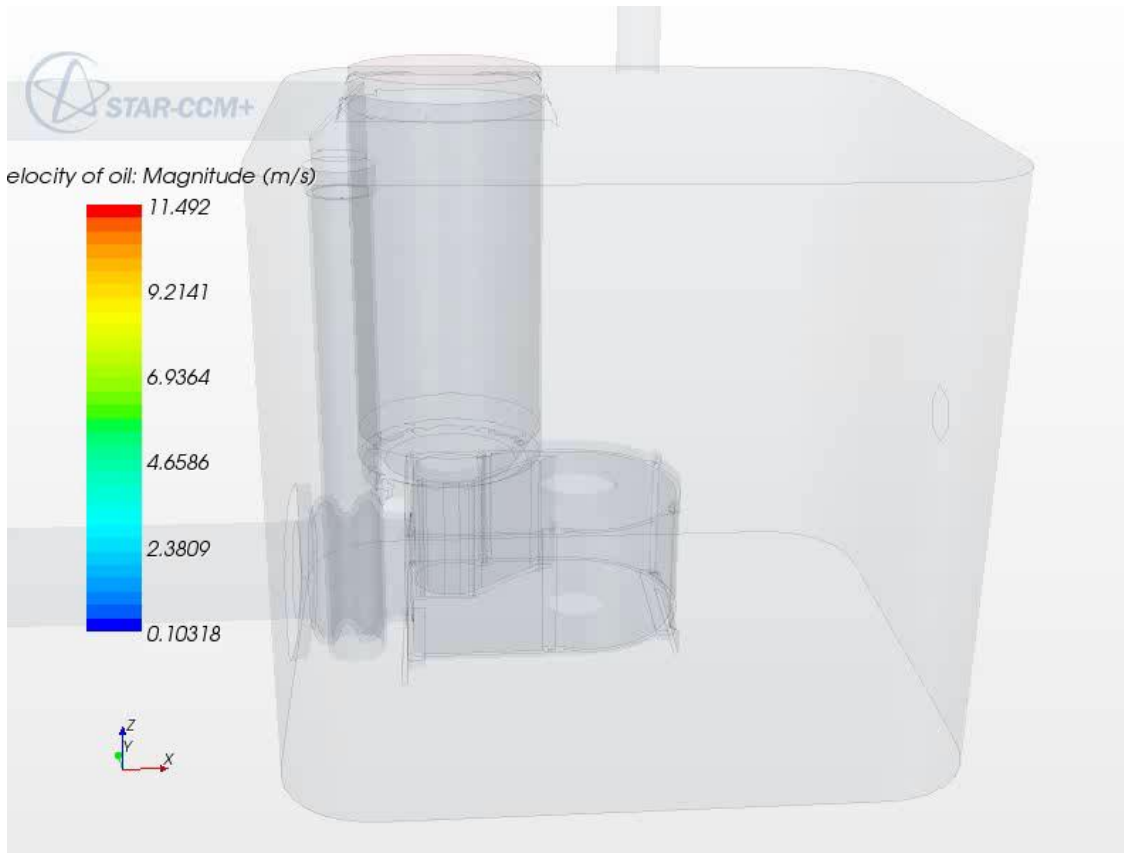
# Simulation - deaeriation



Volume fraction of oil with velocity vectors in plane section of the cyclone

CFD analysis by **devotek**

# Simulation - deaeriation

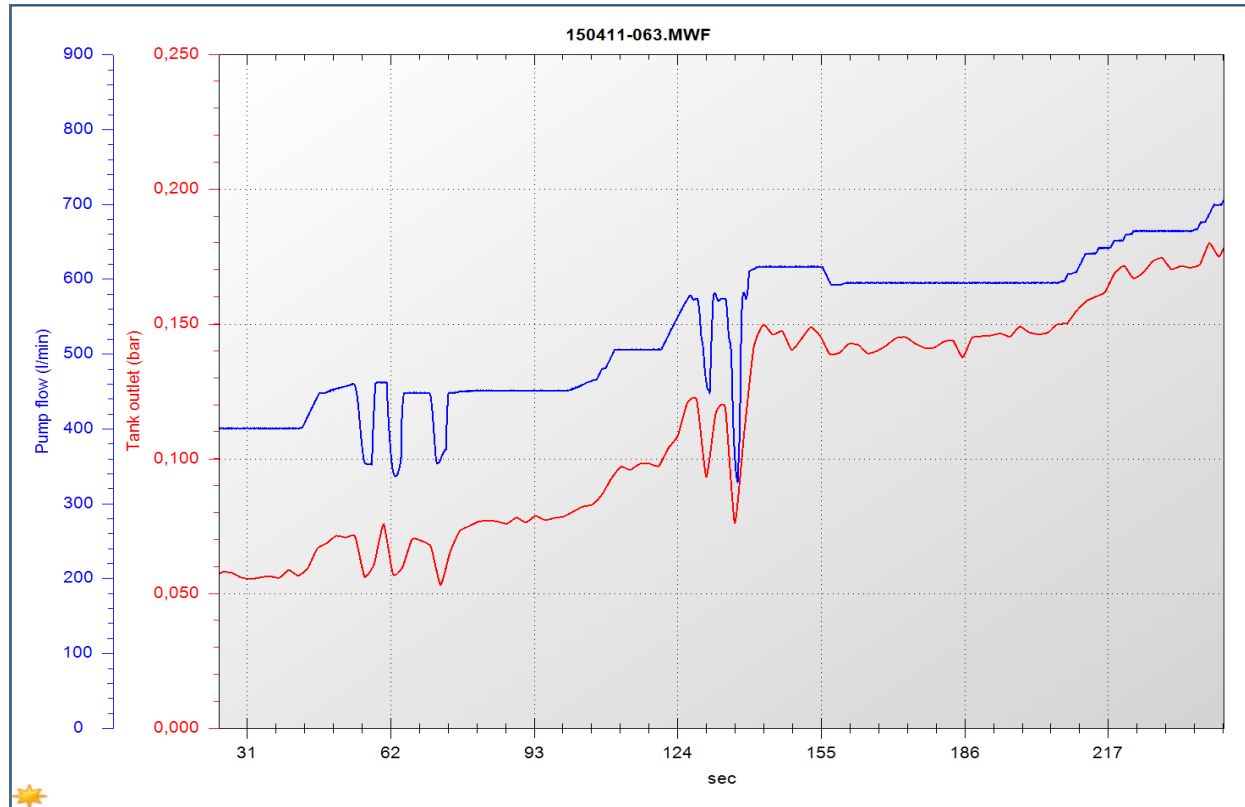


**For demonstration of  
the “cyclone effect”  
click the cyclone**

Velocity of oil through the Cyclone. Grey particles are air released from the oil.

CFD analysis by **devotek**

# Test result – Cyclone outlet pressure



The graph shows the cyclones boost effect with varying pump flow. Increasing pump flow gives increasing, and always positive, pressure in pump suction port.



# Example of savings

Hydraulic system with **650 l/min** pump flow,  
less than **10%** volume variation in the system.

## Conventional:

Tank	2500 Liter
Oil	2000 Liter

<b>Total weight</b>	<b>2500 Kg</b>
Area covered	3,5 m <sup>2</sup>

## CPU :

Tank	120	Liter
Oil	90	Liter

<b>Total weight</b>	<b>100</b>	<b>Kg</b>
Area covered	0,25	m <sup>2</sup>

- Reduced weight approx. 2400 kg
- Reduced space requirement with more than 3 m<sup>2</sup>
- Saving on purchase of oil approx. 40 000 NOK
- Considerable reduced overall cost (purchase, transportation and installation)

# Example of Multi-pump System

## Example:

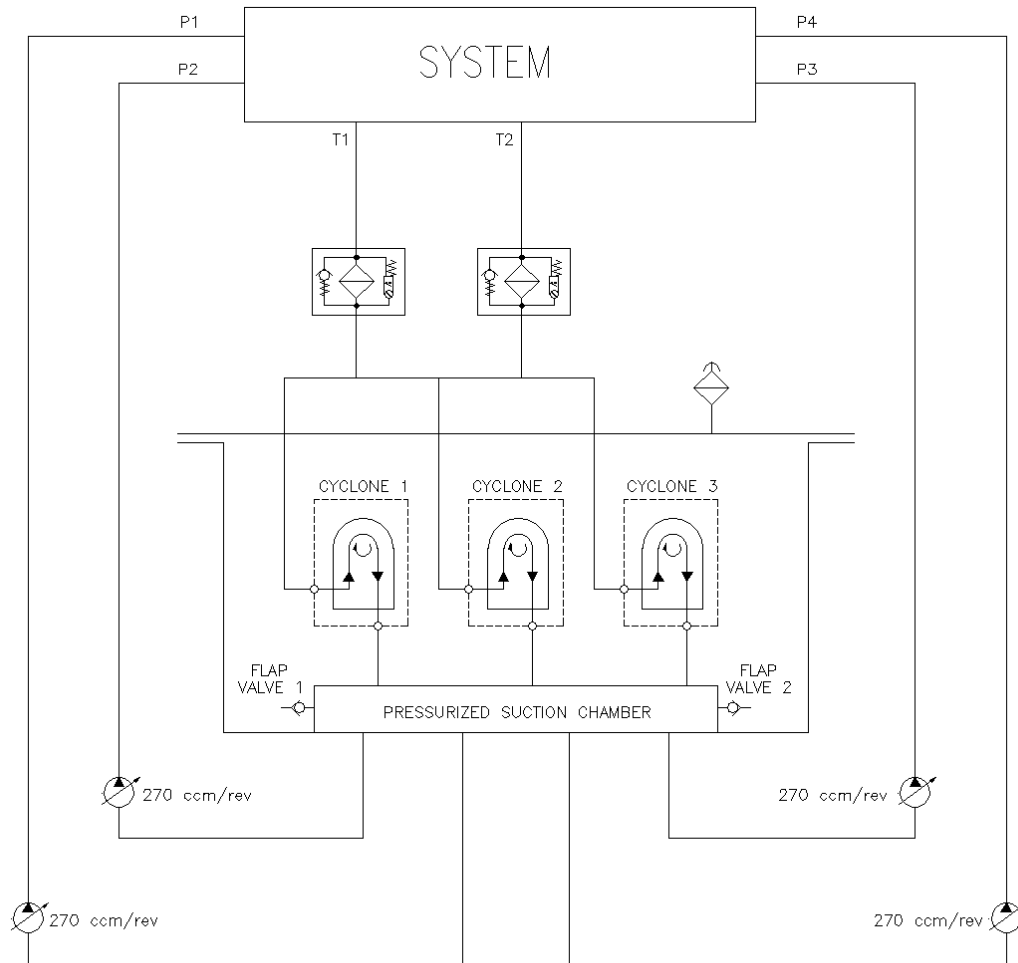
4 x 270 cm<sup>3</sup>/rev (16,5 in<sup>3</sup>/rev) pumps at 1800 RPM.

**Total pump flow 1950 l/min (515 gpm)**

**Reservoir size is 600 liters (158 gal)**

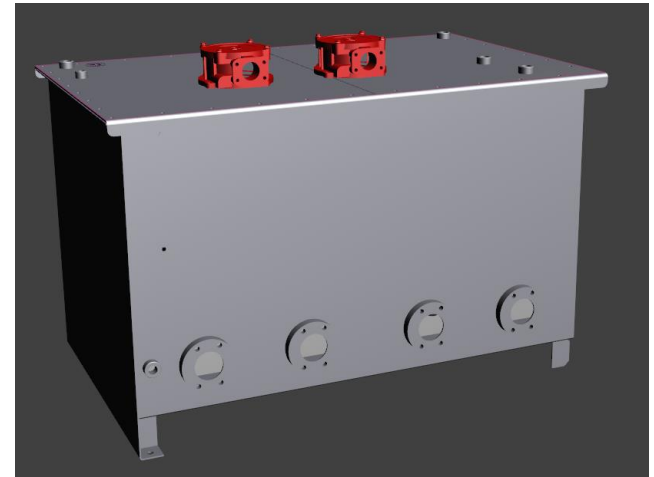
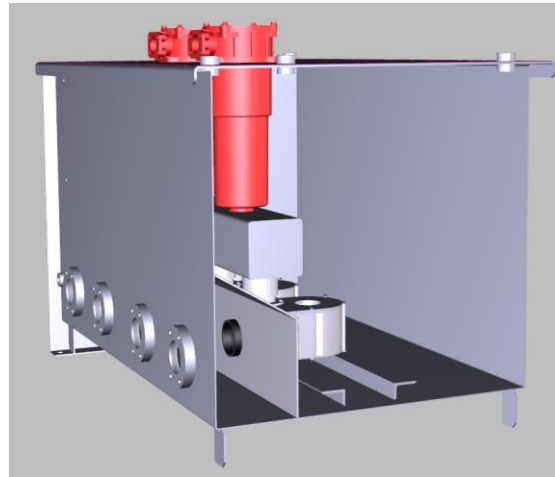
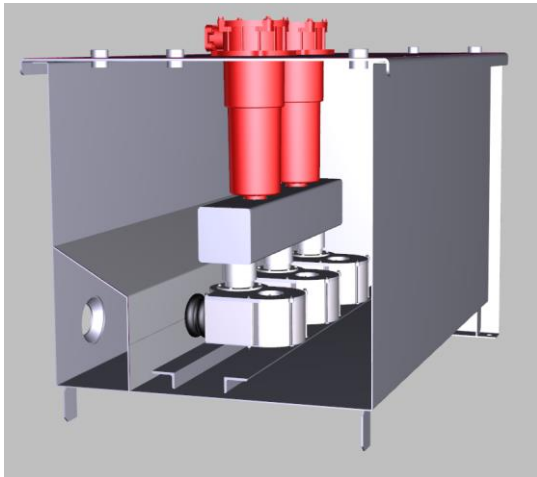
- 3 x cyclons deaerate the returning oil and feed the oil into a pressurized chamber inside the reservoir where the pumps suction ports are connected
- 2 x 3" flap valves are mounted to the suction chamber for securing optimum suction conditions in case significantly less oil is returning from the system than required by the pumps

# Example of multi-pump system



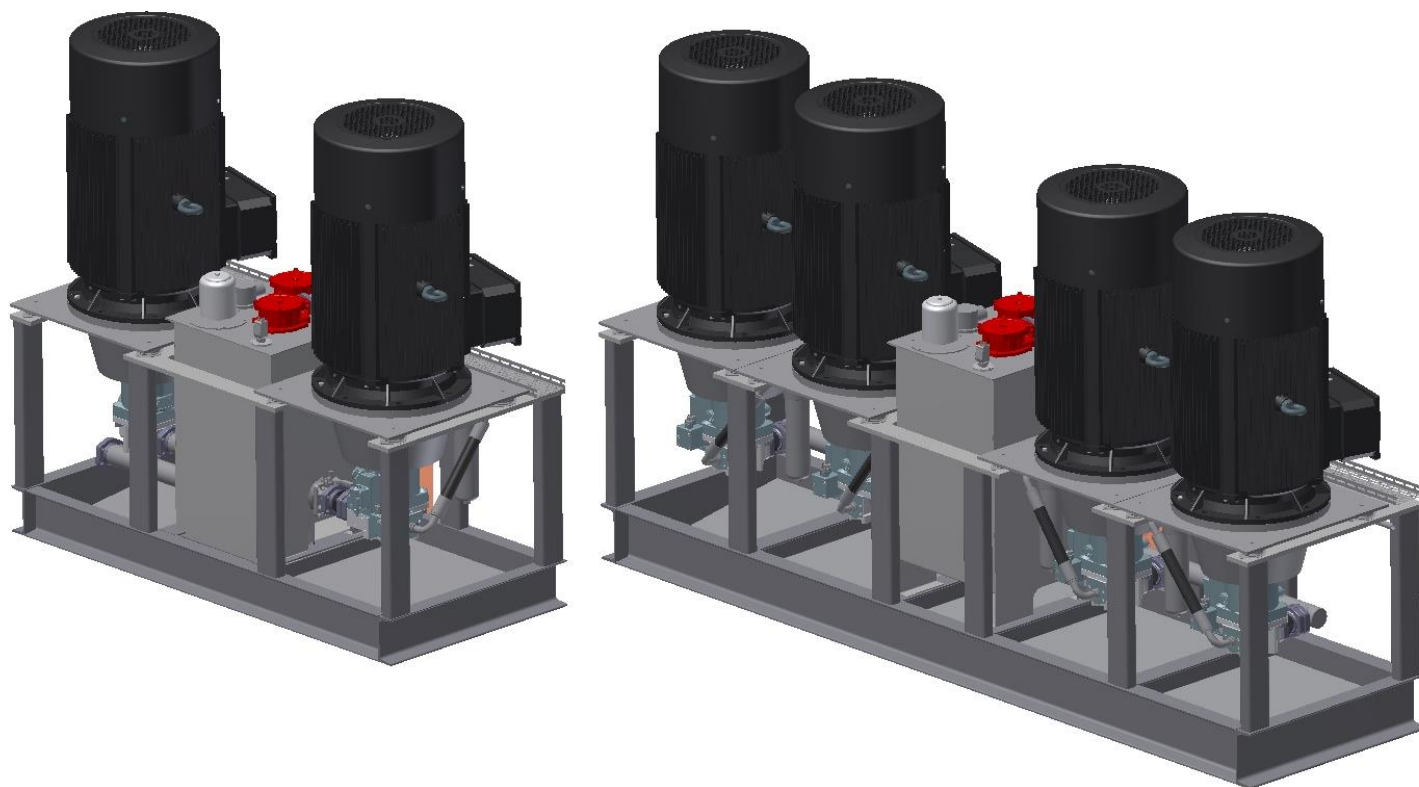
# Example of multi-pump System

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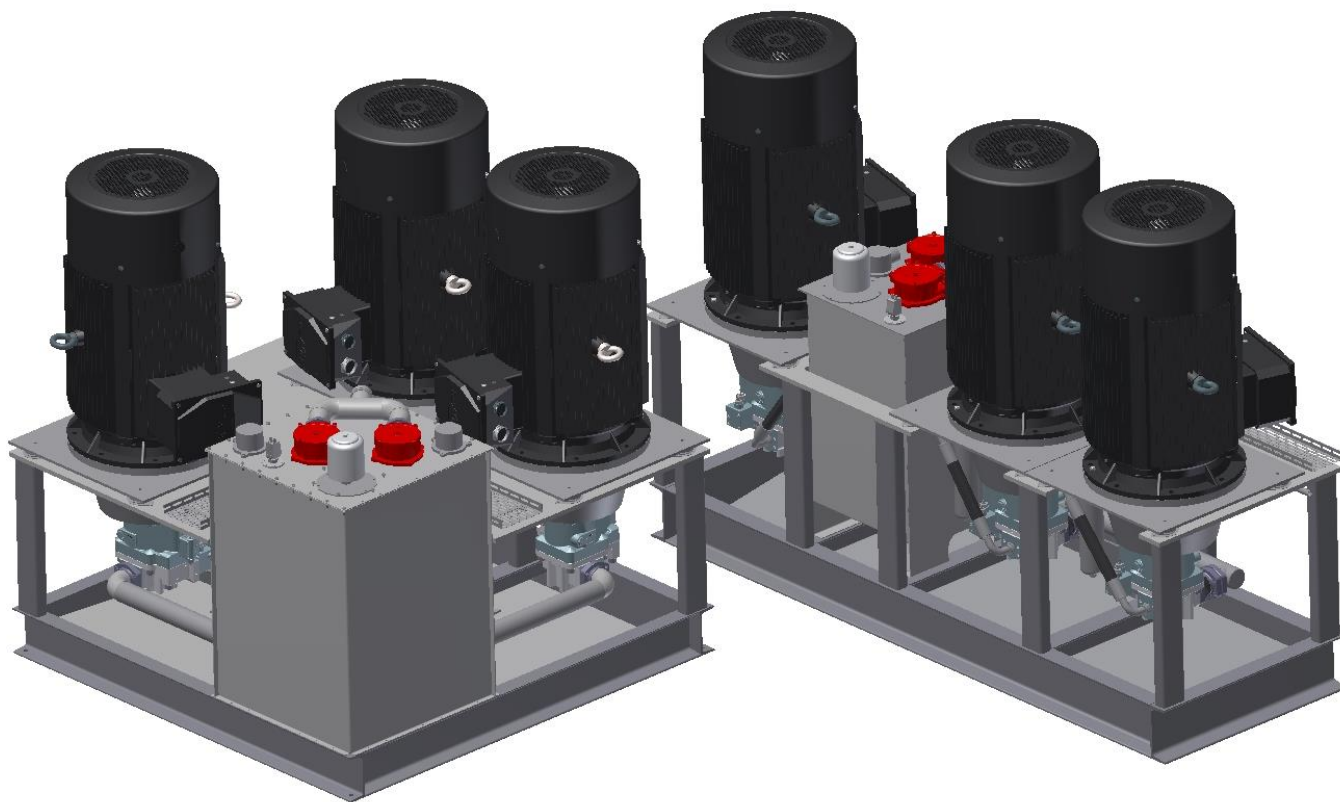
## CPU with 2 or 4 pumps

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# CPU with 3 pumps

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## CPU – standard range

### Max. oil flow in l/min :

Rev./min.	1450			1750		
Quant. of pumps	2	3	4	2	3	4
130 ccr	362	543	724	437	655	874
200 ccr	557	835	1 114	672	1 008	1 344

### Dimension in mm :

Dimensions	Length	Width	Height
2-pumps	2250	1000	2175
3-pumps, slim	3050	1000	2215
3-pumps , square	2000	2000	2125
4-pumps	3850	1000	2215

# Application example

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POWER AND MOTION CONTROL



# Application example

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POWER AND MOTION CONTROL



# Application example Winch

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**See it on YouTube**

[http://www.youtube.com/watch?v=F\\_uOkeTDd0M](http://www.youtube.com/watch?v=F_uOkeTDd0M)

## CPU – summary

- CPU has significantly reduced size of oil tank compared to conventional solutions
- CPU has reduced weight and need for space
- CPU can be used in all mobile and industrial applications, including marine and offshore systems