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Concentric is an innovator in flow control and fluid power, supplying proprietary systems and components for trucks, buses and industrial vehicles, worldwide. With 1,179 employees and yearly sales exceeding 2,283 million Swedish Kronor, Concentric AB is listed on the Stockholm Stock Exchange ([www.concentricAB.com](http://www.concentricAB.com)).



TECHNOLOGY + INNOVATION = SUSTAINABILITY



## Innovation in Flow Control and Fluid Power



**Market Driven Technology**

Concentric is a global company specializing in fluid dynamics and fluid power technologies. Technology development is focused on solutions that provide better fuel economy, reduced emissions, noise reduction and productivity enhancement in trucks, construction equipment, agricultural machinery and industrial vehicles.



**Product Specialists**

Concentric's product specialization is in two areas. The first is lubricating, cooling and fuel transfer pumps for 3 to 16 liter diesel engines, 0.8 to 2 liters per cylinder, used in construction machinery, agricultural machinery and medium to heavy trucks. The second is in hydraulic gear products and solutions for mobile equipment applications. This is what we do and where we excel.

**Laser Focus**

Concentric product and application expertise is not diluted across a broad spectrum of markets and products. There are detailed nuances in product design and manufacturing that make significant differences in performance and reliability. Our focus on specific products in specific market segments has allowed us to develop unmatched expertise in these areas. We have a unique understanding of the capabilities of our products that enables us to go beyond the traditional limits to meet specific application needs. Our many years of experience have made us the experts in our field.

**Regulation in the U.S., EU and Asia**

<b>US EPA OFF-HIGHWAY STANDARDS</b> 175+hp   75-175 hp   <75 hp	<b>TIER 4</b>
<b>US EPA ON-HIGHWAY STANDARDS</b> >33,000 lb. GVWR   19,500 to 33,000 lb. GVWR 8500 to <19,500 lb. GVWR	<b>US'10</b>
<b>Light-Duty</b>	<b>TIER 2</b>
<b>EUROPEAN UNION (EU) OFF-ROAD STANDARDS</b> 130-560 KW   56-130 KW	<b>STAGE 4</b>
18-56 KW	<b>STAGE 3b</b>
<b>EUROPEAN UNION (EU) ON-HIGHWAY STANDARDS</b> Light-Duty Vehicles   Heavy-Duty Vehicles	<b>EURO 6</b>
<b>JAPAN STANDARDS</b> Light-Duty Vehicles   Heavy-Duty Vehicles	<b>JAPAN 2009</b>
<b>BRAZIL STANDARDS</b> Light-Duty Vehicles   Heavy-Duty Vehicles	<b>EURO 5</b>
<b>CHINA STANDARDS</b> Major City Light-Duty Vehicles   Nationwide Heavy-Duty Vehicles	<b>EURO 5</b>
<b>INDIA STANDARDS</b> Major City Light-Duty Vehicles	<b>EURO 4</b>
Nationwide   Heavy-Duty Vehicles	<b>EURO 3</b>
<b>KOREA STANDARDS</b> Light-Duty Vehicles   Heavy-Duty Vehicles	<b>EURO 4</b>
<b>RUSSIA STANDARDS</b> Light-Duty Vehicles   Heavy-Duty Vehicles	<b>EURO 4</b>

**Solution Driven**

Concentric competes in niches where there is typically a higher technological content to the products or where it can provide specific solutions to its customers. Concentric applications specialists start by making sure they understand the overall objectives for the vehicle, system or subsystem. This understanding enables them to respond with customized value-engineered solutions which accurately reflect each customer's requirements and priorities. Our engineers continue to work with customers to ensure the right solution for their engines or machines has been implemented by providing ongoing engineering support and testing.



\* 50/50 joint venture between Alfa Laval & Concentric

**Global Design and Manufacturing**

To provide local support to our global customers, Concentric's global manufacturing presence includes factories in Sweden, Germany, the UK, the USA, India and China. All are backed by central support and development functions. Concentric has two principal development centers, one each for engine products (in the UK) and hydraulic products (in the USA). In addition, there are local engineering resources that give close customer support and application expertise. Each facility has the capacity to conduct performance, sustainability and environmental testing, supported by software modeling and diagnostic tools.



**Providing Value Through Business Excellence**

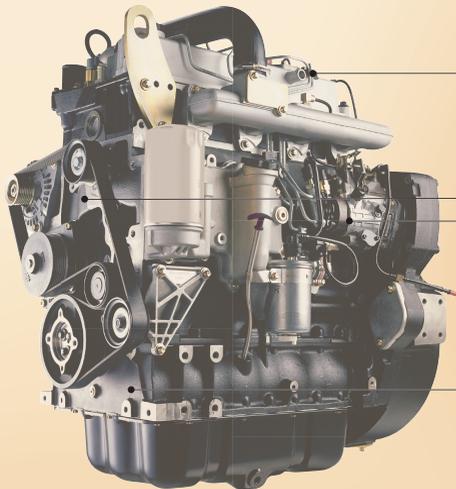
The Concentric Business Excellence Program is the foundation for continuous improvement of the company's processes. It is a formal program that ensures that the business is focused on the needs of our customers, employees and other stakeholders. It provides a framework for continuous improvement in the areas of leadership, strategic planning, customer focus, knowledge management, workforce development and operational excellence. The Concentric Business Excellence Program serves as our customer guarantee for receiving great solutions, products and services.



### Improving Fuel Economy and Emissions

Diesel engine manufacturers are challenged to meet rigorous emissions requirements without reducing engine performance or increasing fuel consumption. Concentric's engine pump solutions continue to make positive contributions to meeting these challenges. Concentric pumps are the market leader and benchmark in lubrication, cooling and fuel transfer pumps for medium- to heavy-duty diesel engines.

- Close collaboration with each customer's design team to optimize performance, packaging and cost
- Unrivalled experience in designing for the increased performance and torque capacity of the latest engines even in cold start-up conditions
- Improved fuel economy/reduced CO<sub>2</sub> when variable flow pumps utilized
- Integrated front-end assemblies incorporating oil and water pumps



Alfdex



Coolant Pump



Variable Flow Coolant Pump



Fuel Pump



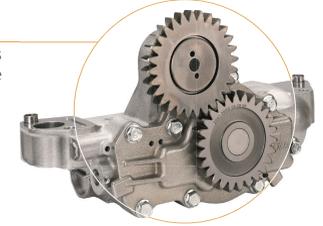
Oil Pump



Variable Flow Oil Pump

### Variable Flow Oil Pumps

- Concentric VFP technology offers significant benefits on typical duty cycles through improved fuel economy, noise reduction and exceptional pressure control, while also delivering the additional benefit of CO<sub>2</sub> reductions.
- The Concentric variable flow oil pump (VFP) is an energy-efficient rotor design that provides infinitely variable lubrication for the new generation of engines, reducing fuel consumption by as much as 2%.
- The compact, durable design uses two rotors to align flow to demand, so reducing power requirement and fuel consumption. The driving rotor operates in the normal manner while the position and flow of the second eccentric rotor is controlled either mechanically or electronically.
- Many global OEMs are working closely with Concentric on variable flow pump applications, with contracts secured in line with the next emissions legislation.



### Variable Flow Coolant Pumps

- Concentric VFP technology offers significant benefits on typical truck duty cycles through improved fuel economy, and also delivers the additional benefit of CO<sub>2</sub> reductions.
- The Concentric variable flow coolant pump is an energy-efficient design intended primarily for medium- and heavy-duty commercial vehicles, providing the next generation of engines with infinitely variable coolant flow, and reducing fuel consumption by up to 2%.
- The patented design is speed-controlled to maximize power saving with the control of the pump effectively matched to the engine requirements at any given time. The pump does not require a rotary seal, which is generally considered as the "weak point" of a coolant pump.
- Many global OEMs are working closely with Concentric on variable flow coolant pump applications in preparation for the next generation of engines.



### Alfdex (for additional information, go to [www.alfdex.com](http://www.alfdex.com))

- Alfdex offers high-efficiency removal of oil droplets and soot particles from the crankcase gases on diesel engines.
- The system uses centrifugal technology to eliminate particles down to 0.1 gram/hour or below at normal driving conditions to achieve optimal functioning of a closed crankcase ventilation system.
- At a separator speed of 7000–8000 rpm, oil and soot particles are removed from the gas by forces of around 2500 G's and returned to the oil sump.
- Designed to meet new and tougher engine legislation that takes into account not only exhaust pipe discharges but also crankcase gases.
- "Fit and forget" – no service required; designed for continuous operation during engine lifetime.



### Oil Pumps

- Concentric oil pumps have been proven over many years and many millions of miles in a diverse range of applications, including trucks, agricultural equipment, construction machinery and industrial power generation.
- Concentric offers our customers complete flexibility with options of rotor pumps or gear pumps of either aluminum or cast iron construction.
- All Concentric oil pumps are custom designed to perfectly meet specific customer requirements.



### Coolant Pumps

- Concentric water pumps have also been proven over many years and many millions of miles in a diverse range of applications, including trucks, agricultural equipment, construction machinery and industrial power generation.
- The experienced Design and Development team at Concentric has developed software that allows Concentric to push the boundaries of conventional coolant pump efficiency through optimizing both impeller design and volute geometry.
- All Concentric coolant pumps are custom designed to perfectly meet specific customer requirements.



### Fuel Transfer Pumps

- Concentric's advanced fuel transfer pumps are integrated into the high-pressure injection system, delivering improved throttle response, fuel economy and adherence to reduced noise standards.
- Medium-pressure pumps designed for unit injector and common rail fuel systems.
- Bearings, seals and priming valve specified for all fuel applications.
- Concentric utilizes its advanced fuel testing facilities to model increased flow and pressure control, dry prime, cooling, stalled flow and the effects of dirty or low-lubricity fuels.



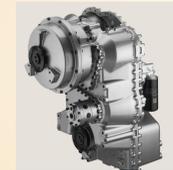
### Hydraulic Custom Solutions

We focus on the areas where we can create customer value. Our applications expertise enables us to take on our customers' most unique application challenges. The foundation for this expertise is an expert knowledge of hydraulic systems. The value we bring to our customers is our unique capability to integrate a variety of system components and controls and to provide multiple functions in one custom package.

Our applications specialists seek to understand the overall objectives for the vehicle, the vehicle subsystems and then the hydraulics system. This understanding enables them to respond with customized value-engineered solutions. Concentric Hydraulics was the first to offer many of the solutions shown here.



Electrohydraulic Lifting Systems



Powershift Transmission Lube and Charge



Supplemental Power Steering Systems



Auxiliary Hydraulic Power



High Speed Rotary Drive Systems



Axle Cooling and Lube Systems  
Fan Brake with Integrated Brake Charge Function



Lift, Steer and Auxiliary Systems

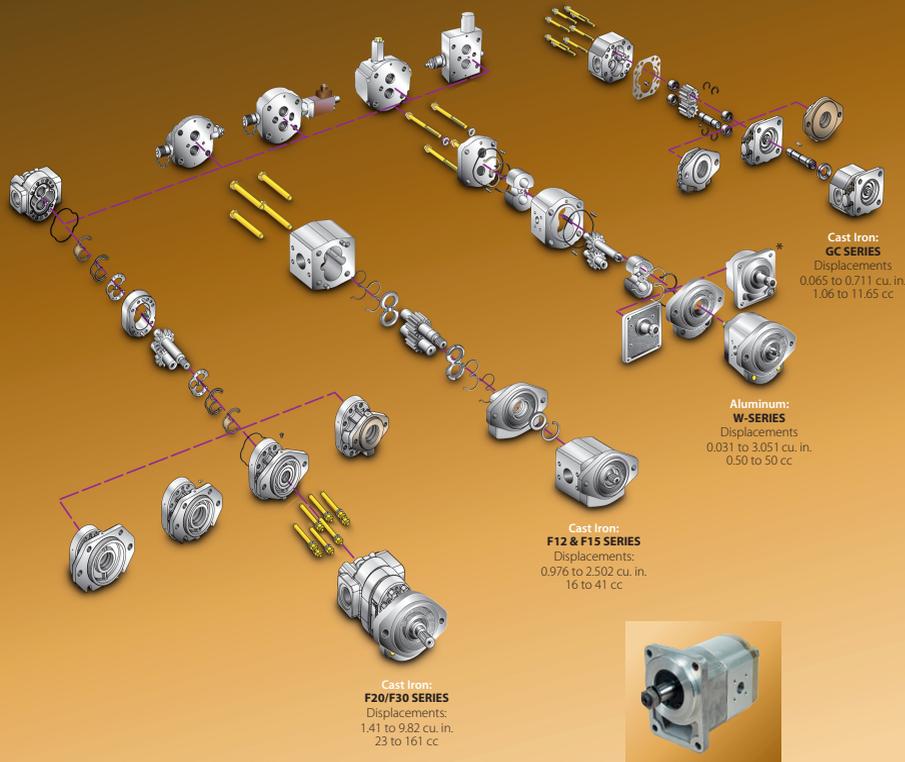


Fan Drive System

# Hydraulic Pumps and Motors

Concentric offers the widest range of gear pumps in the industry. Displacements range from 0.031 to 9.82 cu. in. (0.5 cc to 161.0 cc) in single or multiple section pump configurations. Integrated control valves provide added functionality to the product line. A wide variety of flange and shaft options are available on both cast iron and aluminum bodies. Concentric is a gear pump specialist. The extensive product offering insures that the optimal product performance and configuration can be tailored to virtually any application requirement.

High speed fluid motors are available in displacements of 0.031 to 9.82 cu. in. (0.5 cc to 161.0 cc). High volumetric efficiency is a trademark of Concentric fluid motors. Our full range of unidirectional and bidirectional fluid motors features numerous configurations and options to solve a variety of fluid motor applications. We also offer rotary gear flow divider units up to 4 sections for proportional division of output or intensified flow.



\*Outboard ball bearing flange option available

## Cast Iron Pumps Heavy Duty



### GC Series Pumps

Displacements  
0.065 to 0.711 cu. in. (1.06 to 11.65 cc)

### GC Series High/Low Pumps

High Pressure Displacements  
0.065 to 0.258 cu. in. (1.06 to 4.22 cc)  
Low Pressure Displacements  
0.258 to 0.776 cu. in. (4.22 to 12.71 cc)  
Maximum Pressure  
4,000 psi (276 bar)  
Maximum Speed  
4,000 rpm

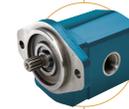


### D Series Pumps

Displacements  
0.232 to 1.395 cu. in. (3.80 to 22.85 cc)

### D Series High/Low Pumps

High Pressure Displacements  
0.465 cu. in. (7.62 cc)  
Low Pressure Displacements  
0.930 to 1.395 cu. in. (15.24 to 22.86 cc)  
Maximum Pressure  
3,000–4,000 psi (207–276 bar)  
Maximum Speed  
3,600–4,000 rpm



### F12 & F15 Ferra Series Pumps

F12 Displacements  
0.976 to 2.502 cu. in. (16 to 41 cc)  
F15 Displacements  
1.159 to 3.051 cu. in. (19 to 50 cc)  
Maximum Pressure  
4,000 psi (276 bar)  
Maximum Speed  
3,600 rpm



### F20/F30 Pumps & F20-LS/F30-LS Load Sense Ferra Series Pumps

Displacements  
1.41 to 9.82 cu. in. (23 to 161 cc)  
Maximum Pressure  
4,000 psi (276 bar)  
Maximum Speed  
3,600 rpm



### Motor Pumps

Displacements  
0.065 to 9.82 cu. in. (1.06 to 161 cc)  
Maximum Pressure  
4,000 psi (276 bar)  
Maximum Speed  
4,000 rpm



## Aluminum Pumps Medium/Light Duty



### W-Series Pumps

W100 Displacements  
0.031 to 0.122 cu. in. (0.50 to 2.00 cc)  
W300 Displacements  
0.049 to 0.347 cu. in. (0.80 to 5.70 cc)  
W600 Displacements  
0.244 to 0.732 cu. in. (4 to 12 cc)  
W900 Displacements  
0.305 to 1.891 cu. in. (5 to 31 cc)  
W1200 Displacements  
1.526 to 2.014 cu. in. (25 to 33 cc)  
W1500 Displacements  
1.159 to 3.051 cu. in. (19 to 50 cc)  
Maximum Pressure  
4,000 psi (276 bar)  
Maximum Speed  
500 to 4,000 rpm



### WK900 Calma Pumps

Displacements  
0.305 to 1.648 cu. in. (5 to 27 cc)  
Maximum Pressure  
3,336 psi (230 bar)  
Maximum Speed  
4,000 rpm

## Fluid Motors



### Cast Iron

Displacements  
0.065 to 9.82 cu. in. (1.06 to 161 cc)  
Speed  
Up to 10,000 rpm

### Newly Released FM12 & FM15 Cast Iron Fluid Motors

### Aluminum

Displacements  
0.244 to 3.050 cu. in. (4 to 50 cc)  
Speed  
Up to 4,000 rpm

## Flow Dividers



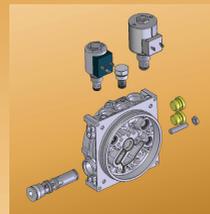
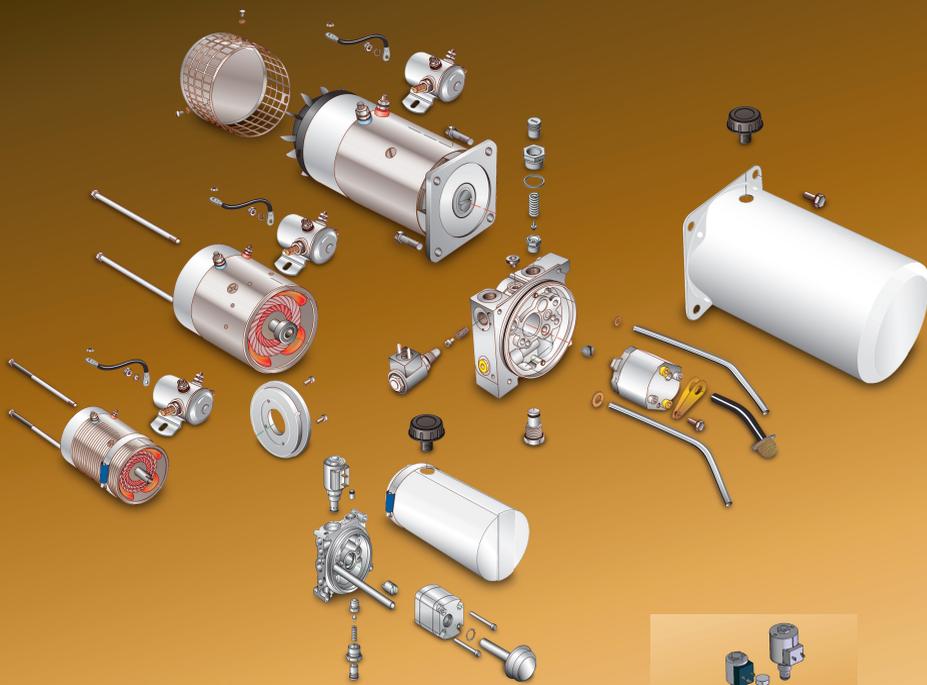
### GC & D Series

GC Displacements  
0.097 to 0.517 cu. in. (1.58 to 8.47 cc)  
D Displacements  
0.232 to 0.813 cu. in. (3.8 to 13.32 cc)  
Maximum Pressure  
4,500 psi (310 bar)  
Maximum Input Flow Per Section  
14 gpm (53 lpm)



# Hydraulic Power Packs

Concentric is one of the world's leading manufacturers of electrohydraulic power packs. Our expertise lies in understanding the diverse set of variables involved in matching the correct electric motors, hydraulic pumps and control valves to suit specific application requirements. Whether the application calls for a complete system with integrated reservoir and control valves or a pump/motor package, Concentric can configure a system suitable for virtually any application in the mobile equipment as well as industrial equipment markets.



The New HE2200 High Flow Adaptor



## PUMP/MOTORS (DC/AC)

**DC Voltage Range**  
12 to 72 VDC

**AC Horsepower Range**  
1/2 to 3 HP

**Pump Displacements**  
0.04 – 1.71 cu. in. (0.65 to 28 cc)

**Maximum Pressure**  
4,000 psi (276 bar)



## HB800 POWER PACKS

**Voltage Range**  
12 to 24 VDC

**Pump Displacements**  
0.037 to 0.092 cu. in. (0.60 to 1.5 cc)

**Reservoirs**  
0.13 to 1 gal. (0.5 to 3.8 ltr.) plastic

**Maximum Pressure**  
2,610 psi (180 bar)



## HE1000 SERIES POWER PACKS

**Voltage Range**  
12 to 24 VDC

**Pump Displacements**  
0.015 to 0.122 cu. in. (0.24 to 2 cc)

**Maximum Pressure**  
3,336 psi (230 bar)

**Reservoirs**  
0.13 to 1.0 gal. (0.5 to 3.8 ltr.) plastic



## HE2000 SERIES POWER PACKS

**Voltage Range**  
12 to 24 VDC, 115 to 230 VAC

**Pump Displacements**  
0.049 to 0.388 cu. in. (0.80 to 6.36 cc)

**Maximum Pressure**  
3,336 psi (230 bar)

**Reservoirs**  
0.95 qt. to 3.96 gal. (0.9 to 15 ltr.) steel,  
0.8 to 1.7 qt. (0.76 to 1.6 ltr.) plastic



## HE2200 SERIES POWER PACKS

**Voltage Range**  
12 to 24 VDC

**Pump Displacements**  
0.195 to 0.262 cu. in. (3.19 to 4.29 cc)

**Maximum Pressure**  
3,600 psi (248 bar)

**Reservoirs**  
0.5 to 3.0 gal. (1.89 to 11.35 ltr.) steel, cyl. or rect.

# Engineering a Greener Future



## HE "BOX" POWER PACKS

**Voltage Range**  
12 to 24 VDC

**Pump Displacements**  
0.049 to 0.388 cu. in. (0.80 to 6.36 cc)

**Maximum Pressure**  
3,336 psi (230 bar)

**Reservoirs**  
3 qt. to 5.0 gal. (2.84 to 19 ltr.) steel



## HE-Q (QUIET) POWER PACKS

**Voltage Range**  
24 VDC

**WQ300 Pump Displacements**  
0.073 to 0.347 cu. in. (1.2 to 5.7 cc)

**Noise**  
42dB(A)

## BIROTATIONAL POWER PACKS

**Voltage Range**  
12 to 24 VDC, 115 to 230 VAC

**Pump Displacements**  
0.049 to 0.129 cu. in. (0.80 to 2.11 cc)

**Reservoirs**  
2 to 2.96 qt. (1.9 to 2.8 ltr.) plastic,  
1 to 2 gal. (3.8 to 7.6 ltr.) steel



## AC POWER PACKS GC-9500 SERIES

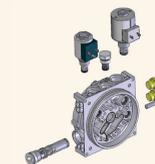
**Displacements**  
0.065 to 1.394 cu. in. (1.06 to 22.85 cc)

**Maximum Pressure**  
3,000 psi (207 bar)

**Maximum Speed**  
3,600 rpm

**Reservoirs**  
5 to 20 gal. (19 to 76 ltr.) steel

## The New HE2200 High Flow Adaptor



- Possible to integrate up to 3 cartridge valves for single acting, 2x single acting or double acting functions directly into the adaptor without external manifolds
- Larger flow control valves can be mounted to accept higher return flows (i.e. lowering at high speed)
- The relief valve can easily be adjusted from the outside
- The pump and motor are equipped with splined drive shafts that improve the life of each, especially at applications with many starts and stops
- The HE2200 offers a cost- and space-efficient solution and improved performance

