EMI

EMI

Electric Motor Integrated Pump

Closed Circuit Operation

Conventional Concepts

Standard pumps require a high torque due to the high flow rate at low speed. Sufficient dimensioning for this torque is also associated with large radial deviations in the design. This in turn inevitably leads to a high inertia of the electric motor and poorer response behavior.

However, in order to achieve sufficient dynamics, a variable-speed motor and pump with adjustable displacement must be used. This results in higher operating costs for the pump and a worse energy efficiency.

In addition to the hydraulic circuit, the electric motor must also be cooled with water via oil cooling. This means that many components are ultimately involved and have to be wired and piped.

EMI Concept

The EMI concept addresses precisely these points of a conventional approach. Two bent axis pumps, which share a drive motor and corresponding drive shaft, are designed with a significantly reduced displacement. This significantly reduces the torque requirement.

However, there is no need to worry about losses in terms of flow rate due to the pumps' high speed capability. The flow offered by the fixed displacement pumps, is determined solely by the motor speed - which is beneficial to efficiency. The radial dimensions of the motor can be greatly reduced in this way. This in turn improves both the response behavior and the energy balance, as well as the costs for the electric motor.

The electric motor is cooled via the hydraulic oil circuit. An additional water cooling circuit is not required. The structurally highly integrated approach therefore manages with a greatly reduced number of parts and requires significantly less piping and wiring.

Design Characteristics

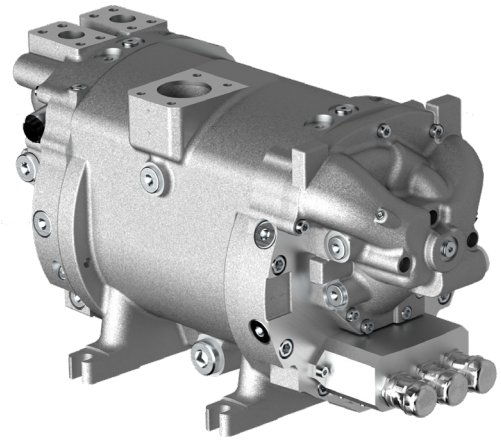
>> High part versatility due to modular design
>> Eccentric structure design
>> Enabling high repeat positioning accuracy

Advantages

>> Lower electrification cost
>> Simple assembly and integration
>> Compact design
>> High efficiency and dynamics

General technical data

Model		EMI
Maximum Displacement		2x42
Nominal pressure	bar	380
Maximal flow	l/min	420
Power	kW	180
Nom. speed	rpm	5000
Voltage	Vdc	540...800



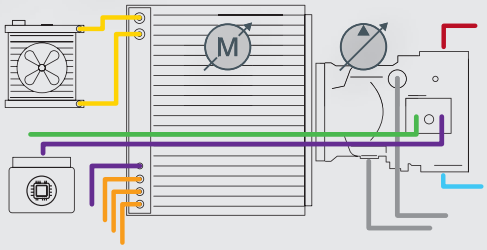
EMI

EMI
Electric Motor Integrated Pump
Closed Circuit Operation

HY Powertrain

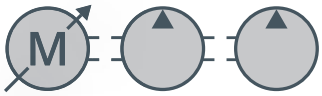
Comparison of Electrical Drive Concepts

Conventional Concept 1

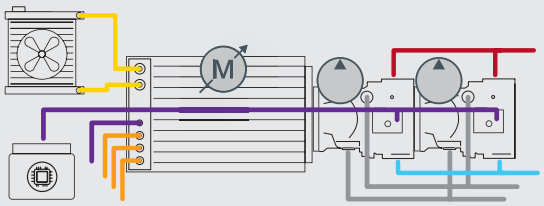


Dyn. response | Dyn. Ansprechverhalten
Speed capability | Drehzahlfähigkeit
Efficiency | Effizienz
Ease of integration | Integrationseinfachheit
Compactness | Kompaktheit

1 x 210 cc pump | Speed: 2100 rpm | Torque: 1270 Nm | Pressure: 380 bar | Nominal flow: 440 l/min



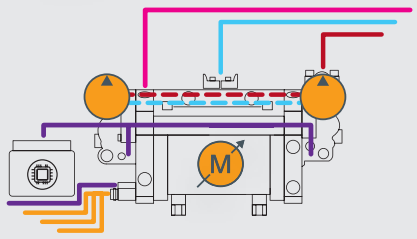
Conventional Concept 2



Dyn. response | Dyn. Ansprechverhalten
Speed capability | Drehzahlfähigkeit
Efficiency | Effizienz
Ease of integration | Integrationseinfachheit
Compactness | Kompaktheit

2 x 55 cc pump | Speed: 3500 rpm | Torque: 335 Nm | Pressure: 380 bar | Nominal flow: 440 l/min

Innovative Concept EMI (Electric Motor Integrated Pump)



Dyn. response | Dyn. Ansprechverhalten
Speed capability | Drehzahlfähigkeit
Efficiency | Effizienz
Ease of integration | Integrationseinfachheit
Compactness | Kompaktheit

2 x 42 cc pump | Speed: 5100 rpm | Torque: 255 Nm | Pressure: 380 bar | Nominal flow: 420 l/min

PIPING
- Work port P
- Internal
- Work port T (suction/precharge)
- Internal
- Piloting
- Leakage oil
- Tank ventilation
- Cooling system (e-motor)

WIRING
- High voltage circuit