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CytroCore for Hydrogen - Compressor Drive

Servo-hydraulic drive technology offers significant competitive advantages.

Compact – Power dense – Efficient

Factsheet | Industrial Hydraulics

ADVANTAGES

- **Compact:**
  the footprint of only 0.5 m² allows easy integration into standard containers. Electrics and servo hydraulics are located in one unit, and the control cabinet for controlling the drive is integrated. The number of interfaces is reduced to a minimum. Just like the amount of oil: there are only 26 liters in the system.
- **Power dense:**
  90 kW peak power and 60 kW continuous power packed in only 1.2 m³. Flow rates of up to 227 l/min and system pressures of up to 315 bar. This enables high piston speeds for high compressor outputs.
- **Efficient:**
  best efficiencies thanks to primary displacement control without valves in the main circuit. The proven A4VZA pump technology in block-mounting minimizes flow losses.
- **Economical:**
  savings in space, components, energy, fluid, noise protection measures, etc. result in considerable competitive advantages for manufacturers and operators.
- **Dynamic:**
  the SHP4V servo-hydraulic pump unit ensures low time constants and impresses with very short acceleration and deceleration phases.
- **Quiet:**
  noise-optimized components and design ensure low noise emissions.
- **Connected:**
  the CytroConnect condition monitoring solution is integrated and provides important operating data.
- **Standardized:**
  quickly available and tested system solution.

FUNCTION

The CytroCore for Hydrogen is an extremely compact, dynamic, and efficient drive for dry-running reciprocating compressors. As a complete system with software and CGV compressor cylinder (ATEX), it is particularly suitable for hydrogen compressors.

The complete unit of servo hydraulics, electrical engineering and control enables flexible and easy integration into different machine and system concepts. The compressor cylinder is controlled directly, precisely, and dynamically by means of an SHP4V pump unit consisting of an A4VZA pump directly coupled with a variable-speed servo synchronous motor.

In combination with Bosch Rexroth's ATEX-certified CGV compressor cylinders, the end positions are achieved quickly and precisely – even at high loads. In this way, a high gas-side efficiency is achieved at high pressures and high frequencies. The specific software functions were developed based on the Compressor Drive Control software, which is established on the market.

With the entire system, forces of up to 2,500 kN and speeds of up to 0.8 m/s can be generated to achieve the highest compressor performance.

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Servo hydraulics

The servo-hydraulic unit consists of a high-performance SHP4V with a nominal size of 71 cc, as well as all the necessary components of a drive unit (e. g. filter, cooler, tank). Both the SHP4V and the packaging of the CytroCore for Hydrogen are optimized for noise.

Electrics

The integrated control cabinet is placed above the servo-hydraulic unit. This saves installation space and reduces the number of interfaces to a minimum. This simplifies and accelerates integration and electrical work. The CytroCore for Hydrogen has already been tested at the factory, allowing for quick commissioning.

Connections

Only the A and B connections of the compressor cylinder, a mains connection (3x AC 400 V), cooling water inlet and outlet, two inputs for position sensors, and a fieldbus interface have to be connected.

Software

The extended standard software Compressor Drive Control significantly reduces the customer's programming and optimization effort. As an example: only a release and the compressor speed have to be specified for operation.

SPECIFICATIONS

CytroCore for Hydrogen	
Electrical power continuous/peak (kW)	60/90
Working pressure (bar)	up to 315
Flow rate (l/min)	up to 227
Tank volume (l)	26
Footprint (m^2)	0.7 x 0.7
Height (m)	2,27
Weight (kg)	ca. 950

USE CASES

Gas compressors for H_2, LH_2, N_2, He, ...

Compressors for ...

- Testing of pressure vessels
- Filling stations for industrial trucks
- Filling stations for trucks and cars
- Mobile booster units

OUTLOOK

For even larger filling stations or test facilities, an expansion of the power class to **120 kW continuous / 180 kW peak** with the SHP4V/180 is planned for 2025. Other possible features include:

- UL 508A certification
- Extended temperature range
- Control of differential cylinder

PRODUCT SUPPORT

Configuration

The configuration for the system takes place in coordination with experts from Bosch Rexroth. CytroCore for Hydrogen is optimized for use with Bosch Rexroth's CGV compressor cylinders.

The main selection criteria for cylinder sizes are the gas pressure ranges to be achieved and the ratio of low gas pressure to high pressure.