Electronic Pre-Combustion Chamber Injector

Applicable to Gas Engines

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Existing mechanical check valves often foul due to carbon deposits.

This makes it necessary for operators to shut down and clean the check valves every 3-6 months to keep the engine operating properly.

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A fouled check valve can cause the engine to misfire resulting in high hydrocarbon emissions and potential damage to the engine. In addition, the pre-chamber injection event is mechanically fixed and can't be optimized for different operating conditions. The Electronic Pre-Combustion Chamber Injector (ePCi) is ideal for slow speed, two and four-stroke integral gas compression engines. In addition, clients with medium speed gas compression engines can benefit from this product.

ePCi

To address this issue, Siemens Energy has developed a simple yet effective Electronic Pre-Combustion Chamber Injector which allows for increased reliability and durability compared to a standard mechanical pre-combustion chamber. It uses an electro-magnet to force the valve open and closed by spring instead of relying on the standard presurred differential-based mechanical check valve.

This ePCi system enables control of the start-of-admission and end-of-admission events, minimizing contamination during cylinder scavenging and giving precision fuel admission control for improved fuel mixture tuning across all loads and speeds.

The ePCi control hardware can be full integrated with existing systems or comes in a standalone sub-panel built to the end-user's specific requirements.

Features and Benefits

- Reduces engine component due to reduced misfires or incomplete ignition
- Increases time between maintenance intervals from 3-6 months to 24 months
- Eliminates sticking PCC check valves
- Reduced hydrocarbon emissions
- Easier engine startups
- Precise fuel admission control
- Faster troubleshooting of engine issues
- Operators and engine analysts save time due to no longer having to continuously monitor engine fueling

Providing proven maintenance solutions

Technical Description

- Environmental operating temperature: -4 to 302° F (-20 to 150° C)
- Gas supply pressure: 0 to 100 psig (0 to 689.5 kPa)
- Gas supply temperature: -4 to 185° F (-20 to 85° C)
- Gas quality: pipeline quality natural gas (gas must contain negligible amounts of H2S)
- **Process Connections:**
    - Inlet: female 7/16-20, -4 Port per SAE. J514 Table 11
    - Outlet: male 9/16-18, -6 JIC 37° flare per SAE J514
- Valve response (assumes the use of Woodward In-Pulse control)
    - Time to full open after signal on: <1.3 msec open response
    - Time to full close after signal off: <1.3 msec closing response
- Minimum valve cracking pressure: 115 psig (793 kPa)
- Forward flow seat leakage: <0.5% of wide-open flow at 75 psig
- Reserve flow seat leakage: <0.5% of wide-open flow at 500 psig
- Vibration qualification test: US MIL-STD- 810C method 514.2, curve F
- Built-in last chance filtration: 25 microns absolute
- Hazardous location classification:
    - CSA Class 1, Division 2 Groups C&D Temp. class T5 at 85° C ambient temp. Class T3B at 150° C ambient
    - ATEX Class 1, Zone 2 AEx/EX na IIB Temp. Class T5 at 85° C ambient temp. Class T3B at 150° C ambient
- Peak cylinder firing pressure: 2,000 psig (13.8 MPa)

Support Services and Implementation

Siemens Energy Services experts support the customer in all the aspects of installation. Providing upgrade, revamp, repair solutions, and technical support in all project stages.

Scope of Work

Typical manufacturing lead times vary for standard parts depending on the factory workload.

Optional Services: ePCi can be bundled with larger scope emission reduction and reliability improvement projects.

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