AFC Integrated Hydraulic Power Generator (IHPG) and the Mini Hydraulic Power Generator (MHPG)

Technical Data Sheet

The AFC Hydraulic Power Generator (HPG) series offers innovative, sustainable solutions for generating power from the pressure differential in pipeline systems. This review covers the two types of power generators within this series: the Inline Hydraulic Power Generator (IHPG) and the Mini Hydraulic Power Generator (MHPG). Each variant has unique technical characteristics tailored for different applications.

Overview

Both the IHPG and MHPG are designed to harness the kinetic energy from hydraulic systems, converting it into electrical energy. This technology is particularly beneficial for providing power in remote areas with no permanent power supply, enhancing energy efficiency, and supporting green energy initiatives.

Integrated Hydraulic Power Generator (IHPG)

Key Specifications and Features

1. **Valve Size Range**:
   - The IHPG supports larger applications with valve sizes ranging from DN50 to DN1000. This wide range makes it suitable for various large-scale industrial and municipal water systems.
   - The power generator bypass size is DN100, ensuring sufficient flow and pressure for effective power generation.

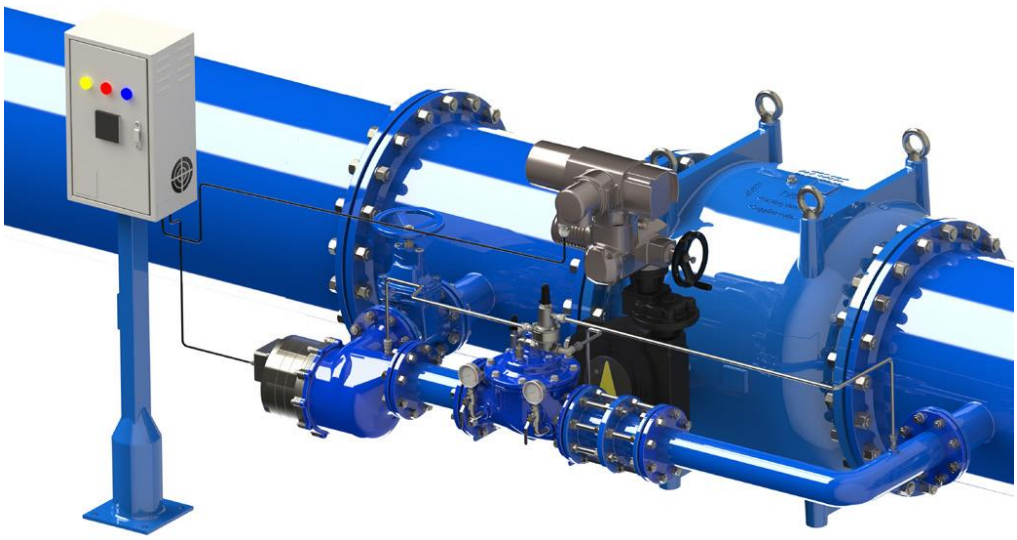


2. **Materials and Construction**:
   - The IHPG's body and rotor shaft are made from high-grade 304/316 stainless steel, offering excellent corrosion resistance and durability.
   - The control pilot is also constructed from 304/316 stainless steel, enhancing the overall robustness of the unit.
   - The use of ceramic bearings ensures exceptional durability, low friction, and resistance to wear and corrosion, contributing to a long operational lifespan.

3. **Pressure and Temperature Ratings**:
   - The IHPG is available in three pressure ratings: PN10 (10 bar), PN16 (16 bar), and PN25 (25 bar), catering to different pipeline pressure requirements.

- It is designed to operate within a temperature range of -10°C to 80°C, making it versatile for various environmental conditions.

4. **Power Generation:**
   - The IHPG can generate power from a minimum pressure differential of 0.5 bar, making it highly efficient even at low pressure differences.
   - The electrical output is sufficient to operate valve controllers and low-power devices. For example, a pressure differential of 1 bar can generate up to 200 mA at 12 volts.
5. **Control and Safety:**
   - Turbine speed is controlled by a differential control pilot, which optimizes the flow rate and pressure differentials to ensure efficient power generation.
   - The design eliminates moving seals in the turbine, preventing water from contacting electrical parts, thus enhancing safety and reliability.
6. **Applications:**
   - The IHPG is suitable for large-scale water distribution systems, industrial applications, and municipal water management.
   - It is ideal for real-time monitoring, valve control, and data logging in remote locations.
   - The system supports cloud-based management and remote control through GPRS, 3G, and 4G networks, allowing for seamless integration with modern communication technologies.

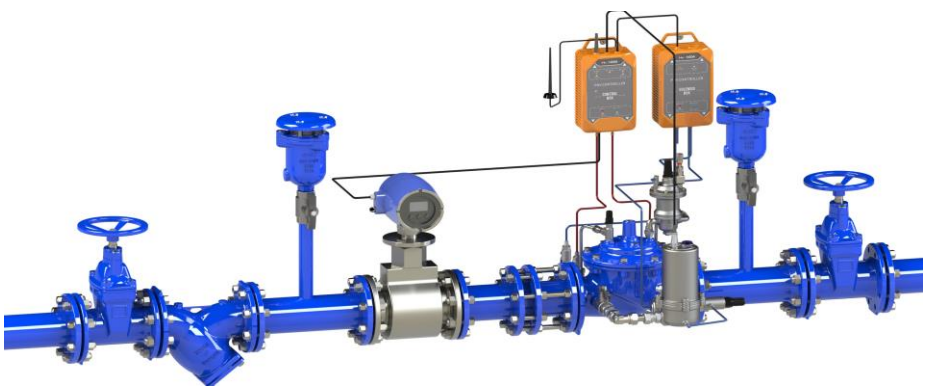


AFC Integrated Hydraulic Power Generator (IHPG) and the Mini Hydraulic Power Generator (MHPG)

Integrated Hydraulic Power Generator (MHPG)

Key Specifications and Features

1. **Valve Size Range:**
   - The MHPG is designed for smaller applications with a nominal diameter of 25 mm (DN25), making it ideal for localized power generation needs.
2. **Materials and Construction:**
   - Like the IHPG, the MHPG's body and rotor shaft are made from 304/316 stainless steel, providing excellent durability and corrosion resistance.
   - The use of ceramic bearings ensures low maintenance and a long operational life, with superior performance in various conditions.
3. **Pressure and Temperature Ratings:**
   - The MHPG is available in pressure ratings of PN10 (10 bar) and PN16 (16 bar), suitable for smaller-scale installations.
   - It operates within the same temperature range as the IHPG, from -10°C to 80°C, ensuring versatility in different environments.
4. **Power Generation:**
   - The MHPG is capable of efficient power generation even with lower flow rates and pressure differentials.
   - It can generate sufficient power to charge batteries and operate low-power consumption devices, ensuring continuous operation of essential systems.
5. **Control and Safety:**
   - Similar to the IHPG, the MHPG features turbine speed control using a differential control pilot, optimizing the power generation process.
   - The design eliminates moving seals in the turbine, ensuring that water does not come into contact with electrical parts, enhancing safety.
6. **Applications:**
   - The MHPG is ideal for small-scale installations, such as residential water systems, remote monitoring stations, and localized valve control.
   - It provides reliable power for sensors, small electronics, and battery charging in off-grid locations, making it a versatile solution for various applications.



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Performance Data

Power Output and Differential Pressure

The power output varies with the differential pressure across the valve:

- **0.1 bar**: 4-6 mA
- **0.2 bar**: 10-12 mA
- **0.3 bar**: 30-40 mA
- **0.4 bar**: 60-70 mA
- **0.5 bar**: 85-95 mA
- **0.6 bar**: 110-140 mA
- **0.7 bar**: 150-160 mA
- **0.8 bar**: 170-180 mA
- **0.9 bar**: 180-190 mA
- **1.0 bar**: 190-200 mA
- **1.2 bar**: 190-210 mA
- **1.3 bar**: 190-210 mA



Both the IHPG and MHPG convert existing hydraulic energy into electricity, reducing reliance on traditional power sources and minimizing carbon emissions. This method produces zero greenhouse gases, offering an environmentally friendly alternative. By harnessing the energy from the pressure differentials within pipeline systems, the HPG series contributes significantly to sustainable energy solutions.

Energy Efficiency

The HPG series improves overall energy efficiency by utilizing pressure differentials within pipeline systems. On-site power generation reduces transmission losses, making it an ideal solution for remote areas where traditional power infrastructure is impractical. This localized power generation minimizes energy waste and enhances the overall efficiency of the system.

Support for Off-Grid Applications

The HPG series is particularly beneficial for remote locations, providing a reliable and continuous power supply. This capability ensures that essential systems, such as pressure management and control devices, remain operational even without a permanent power source. The ability to charge batteries and operate low-power devices ensures that these systems can function autonomously for extended periods.

Integration with Modern Technologies

- **Real-Time Monitoring:** Both the IHPG and MHPG support real-time monitoring and remote control through modern communication technologies like GPRS, 3G, and 4G. This feature allows for continuous oversight and management of the system's performance.
- **Cloud-Based Management:** Data logging and cloud storage enable remote control, historical data review, and software upgrades, reducing the need for on-site maintenance and further cutting down carbon emissions. This integration ensures that the systems remain up-to-date and operate efficiently.

Conclusion

The AFC Inline Hydraulic Power Generator (IHPG) and Mini Hydraulic Power Generator (MHPG) provide versatile and sustainable solutions for generating power from hydraulic pressure differentials. Their robust construction, efficient power generation capabilities, and wide range of applications make them valuable additions to any hydraulic system seeking to enhance energy efficiency and reduce environmental impact. By promoting the use of renewable energy and supporting sustainable development, the HPG series stands as a testament to innovative engineering solutions aimed at achieving a greener future.

By elaborating on the distinct features and benefits of the IHPG and MHPG, this review highlights how each variant addresses specific needs while contributing to a more sustainable and efficient energy landscape.