GFS Pump 1

PEM- / AEM- / AEL Electrolysis Media Pump

TECHNICAL DATA SHEET

The **GFS Pump 1** is a high-performance gear pump specifically developed for demanding electrolysis processes. Engineered with **PEEK precision gears** and a **titanium housing**, it ensures exceptional chemical resistance and mechanical integrity. Its innovative construction eliminates contamination risks, maintaining the purity of water and electrolyte even during extended operational periods.
Thanks to the extremely accurate meshing of its gears, the GFS Pump 1 enables **pulsation-free delivery**, crucial for achieving consistent process conditions. Designed for a wide thermal range, the pump operates reliably up to **100°C**, making it suitable for all major electrolysis technologies, including **PEM**, **AEM**, and **AEL** systems. Compatible with both ultrapure water and electrolyte solutions such as **KOH**, the GFS Pump 1 supports pressure operations up to **7 bar**. Customizable flow rates allow the GFS Pump 1 to be tailored to specific application needs, covering two main operational ranges: **0.05–1 l/min** and **1–25 l/min**.

Key Features

- Precision gear design with PEEK gears and titanium housing for outstanding durability and chemical resistance
- Contamination-free operation ensuring the purity of water and electrolytes during long-term use
- Pulsation-free flow enabled by high-precision gear meshing
- High temperature resistance up to 100°C
- Suitable for PEM, AEM, and AEL electrolysis systems
- Compatible with ultrapure water and electrolytes (e.g., KOH solutions)
- Pressure operation up to 7 bar
- 24V supply voltage for safe and efficient integration
- Full control via GFS Motor Control PCB and CellFlow software
- USB interface for easy PC connectivity and configuration
- Two selectable flow ranges: 0.05–1 L/min , 1–25 L/min
- Customizable flow rates tailored to customer-specific requirements

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Specifications

General Information	for PEM / AEM / AEL - Electrolysis	
Power Supply	24V DC	
Power	25 - 200W	
Materials	Gears	PEEK
	Housing	Titanium Gr. 2
Flow Range	0.01 – 1 l/min	
	1- 25 l/min	
Operating Temperature	Up to 100°C	
Operating Pressure	Up to 7 bar	
Media	Pure Water, KOH	
Media connection	G1/8 or G1/4	
Control Software	GFS Cellflow Software	
Connectivity	USB	

Motor Command Interface

Control and monitor via simple ASCII-based commands transmitted over USB to the integrated STM32 controller. Commands allow reading and setting speed, direction, enable/disable states, and managing alarms and brake conditions.

- All commands must be sent via USB to the STM32 microcontroller
- Commands must start with '-' (minus sign)
- Channel ranges are specified with a colon (x:y) meaning from channel x to y inclusive
- Commands returning multiple values send a byte stream, where each value is 4 bytes (float32)
- Commands setting values expect the channel index followed by the float value
- Communication follows a frame format
    - Start byte: 0x02
    - Length byte: Length of subsequent data

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Command	Description	Expected Behavior
-SPEEDx:y	Read the motor speed for channels x to y.	Returns a byte array containing 4 bytes per float value (2 + 4*n bytes total).
-RAW_SPEEDx:y	Read the raw motor speed for channels x to y.	Returns unprocessed speed data as byte array.
-FILTER_SPEEDx:y	Read the filtered motor speed for channels x to y.	Returns filtered speed values as byte array.
-FILTER_SPEEDx value	Set the filter value for motor speed channel x.	Sets a new filter constant (e.g., low-pass filter parameter).
-OFFSET_SPEEDx value	Set an offset value for motor speed channel x.	Adjusts the baseline offset for motor speed calibration.
-FACTOR_SPEEDx value	Set a factor value for motor speed channel x.	Adjusts the scaling factor for motor speed measurement.
-PWM_SPEEDx value	Set the PWM duty cycle for motor speed channel x.	Sends a PWM command to control the motor speed (0.0–1.0).
-DIRECTIONx:y	Read the motor rotation direction for channels x to y.	Returns the current rotation direction (e.g., forward or reverse).
-DIRECTIONx value	Set the motor rotation direction for channel x.	0 = Reverse direction, 1 = Forward direction.
-ENABLEx:y	Read the motor enable status for channels x to y.	Indicates if motors are enabled (active) or disabled.
-ENABLEx value	Enable or disable the motor channel x.	0 = Disable motor, 1 = Enable motor.
-ALARMx:y	Read alarm state for motor channels x to y.	Reports active alarms or error conditions.
-BREAKx:y	Read brake status for motor channels x to y.	Returns whether the motor brake is active or inactive.
-BREAKx value	Set the brake state for motor channel x.	0 = Release brake, 1 = Engage brake.

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