xavitech
INTELLIGENT PUMPS

T. +46(0) 611 55 61 00 F. +46(0) 611 78 25 10 W. www.xavitech.com

SERIAL FLOW CONTROL

For Xavitech software version 35.0

- ***Frequency adjustment***
- ***16-bit resolution***

> DESCRIPTION

The pump frequency, and thus the flow, can be changed independently of the applied voltage. This is an important feature that enables flow control independently of supply voltage and thus a lower flow can be achieved without reducing maximum vacuum/pressure. This also reduces current consumption and the need of flow restrictors. It is both costeffective and power efficient.

> ASYNCHRONOUS COMMUNICATION

The standard pump has 9600 baud asynchronous communication at 8bit using one start bit no stop bit and no parity. Serial communication with SPI or I2C can be implemented on special requests, but the purpose of this document is to describe standard pump.

> SERIAL PROTOCOL

By default pump frequency is controlled by analog input pin I/O X. This is further described in installation and operation notes in the datasheets of standard pumps. Analog frequency control will be automatically turned off and switched to serial control when first serial package is sent. After that I/O X only works as a pump on/off switch. The command package is 10 bytes long:

‹0› ‹0› ‹0› ‹0› ‹1› ‹126›
‹129› ‹Lo Byte› ‹Hi Byte› ‹CHKSM›

Maximum allowed time between the bytes in the package is 10mS.

The frequency is defined as a 16-bit number and is actually a delay time between each new pump stroke. Therefore the highest frequency is achieved by the lowest number. The lowest allowed delay time on the standard pump is 80 delay units and the maximum allowed delay time is 65535. That represents about 160Hz to 0,5Hz at free flow. If it is liquid being umped the maximum flow is not at the maximum frequency. Depending on viscosity the maximum flow can be found by gradually decrease frequency from maximum until a maximum is observed. This 16-bit number is sent to the pump as two bytes. The Hi Byte and the Lo Byte.

> CHECKSUM

To ensure that the package is complete and correct a checksum has to be sent to the pump as the last byte in the package. The checksum is a sum of all first nine bytes in the command package sent to the pump. This number usually becomes larger than one byte. By only using the lower 8 bits of the checksum, the checksum can fit into a byte. Example:

Delay = 1000

‹0› ‹0› ‹0› ‹0› ‹1› ‹126› ‹129› ‹232›
‹3› ‹235›

> COMMAND CONFIRMATION

Within 100mS the pump should return the byte ‹165› as a confirmation that command was executed. If the pump return ‹90› then command checksum was incorrect. If no confirmation is received within 100mS the pump has not detected a complete command.

ELECTRICAL INTERFACE

PIN	Description	Voltage range
VCC	Supply	
GND	Ground	
I/O X	Max freq.	
	Freq. Control	See each pump
	Pump stop	0 V
I/O R	Serial receive	= 0-0.05V
	10k Ohm internal	= 0.05 - 2.75V
	pull-up	= 2.8 - 3.3V
I/O T	Serial transmit	Logic hi=1.71 - 3.3V
	10k Ohm internal	Logic lo=0-0.85V
	pull-up	

Serial_flow_control_100331