TG-300 Gear Pump

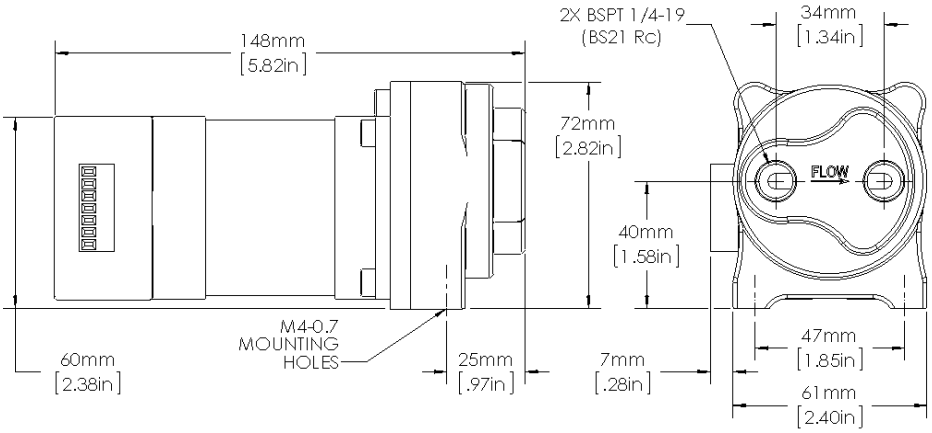
Compact, Heavy Duty, Industrial, Quality

Variable Flow Rate 0 to 400mL/min
Simple, Long Life, Rugged Design
24VDC Brushless Motor w/ Integrated Controller
Viscosity Range 30 cSt to 1200 cSt

Feature and Specifications Comparison	60Hz
Operating Voltage Nominal (recommended)	24 VDC
Operating Voltage Range	14 to 28 VDC
Flow Rate Nominal (For VIN @24VDC, Vspeed @3.0VDC	300 mL/min (4.7 gph)
Flow Range (Continuously Variable)	0 to 400 mL/min (6.3gph)
Attainable Pressure	>100psi (6.9 bar)
Lift, Self Priming (wet)	>2ft (.6m)
BSPT Ports (BS21 Rc) (*Not compatible with pipe thread*)	1/4-19
Max Ambient air temperature	104°f (40°c)
Rated current	4 Amps.
Max oil temperature	392°f (200°c)
Max oil viscosity	~1,200 cSt

Wetted Materials:

- Carbon Steel
- Aluminum
- Viton
- Teflon



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General

The TG-300 pump delivers 0 to 400mL/min (6.3gph) of controlled flow. It is a self-priming and quiet-running gear pump for use in a wide variety of metering or process applications with non-corrosive fluids such as oils and coolants. It can produce over 100 psi (6.9 bar) pressure.

Plumbing Considerations

This pump produces flow not pressure. Like a turnstile, every rotation of the pump delivers a metered volume to the other side. Whatever system is connected to the pump creates resistance to flow, which is the source of any backpressure as the pump works to maintain flow. Small pressure pipes will create excessive backpressure that could exceed the rating of the pump. Therefore, elbows and long runs of pipe should be avoided where possible. Small suction pipes can starve the pump and reduce output flow by causing cavitation.

The size of hose or piping is dependent on the viscosity of the pumped fluid. Generally, hose or pipe of .25" (6mm) should be used. The suction hose in particular should be as short as possible. A max of 36" is a good rule of thumb. If the pump is to be used exclusively at lower flows smaller pipes may work.

Motor, Speed Control

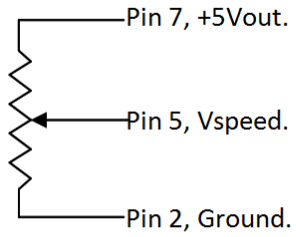
The pump's motor can be controlled for speed, independent of torque. This provides the capability to vary the pump's flow from 0 to Max while maintaining the ability to hold system pressure. The speed is set by way of a .5VDC to 5VDC signal on pin 5. The pumps flow rate at 0 pressure can be calculated within ± 15mL/min as follows:

$$\text{mL/min} \approx \text{Vspeed} \cdot (3.15 \cdot \text{VIN} + 50) - 1.5 \cdot \text{VIN} - 35$$

Pin 1. VIN	This is the 24VDC power input for the pump.
Pin 2. PGND	This is the 0VDC power ground for the pump.
Pin 3. Run/Stop	For most applications, this pin can simply be left open. If a quick pump stop is desired such as in a dosing application, it can be brought to ground to stop the pump. Otherwise, bringing Pin 5 to 0VDC is a simpler and softer way to stop the pump
Pin 4. PG Out	This pin can be used to read the motor speed. Motor speed is a good approximation of pump flow. It is an open drain output with a max. rating of 30VDC/50mA. Motor PRM is 30 times PG Out in Hz. A 10k ohm pull-up resistor to pin 7 is recommended when this feature is used.
Pin 5. Vspeed	This pin is the 0 to 5VDC speed signal input that is used to control the pump speed as described below.
Pin 6. Direction	This pin should be left open. The Direction input is internally pulled up with a 10k resistor to run the pump in the correct direction.
Pin 7. +5V Out	This pin is a source of 5VDC for use in controlling the pump speed only, as described below. Drawing excessive current thru this pin will damage the motor controller.

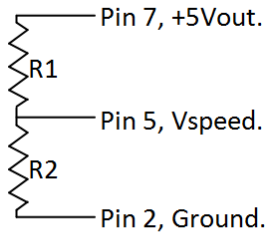
There are three common ways to set Vspeed signal voltage shown below. The voltage divider method offers a simple “set it and forget it” fixed speed solution where the pump flow required always stays the same. The Potentiometer method is similar but adds the ability to ‘tune’ the set point to match requirements. The amplifier method is ideal for adding ‘closed loop’ capability using a pressure or flow metric such as a transducer.

With a potentiometer.



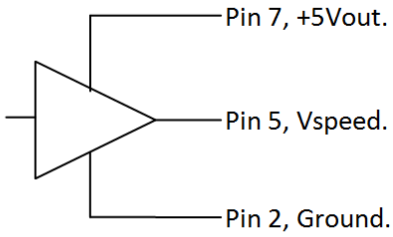
Use a 5k to 10 k Potentiometer.

With a voltage divider



R1 + R2 = 5k to 10k.
Vspeed = 5 x R2 / (R1 + R2)

With an amplifier



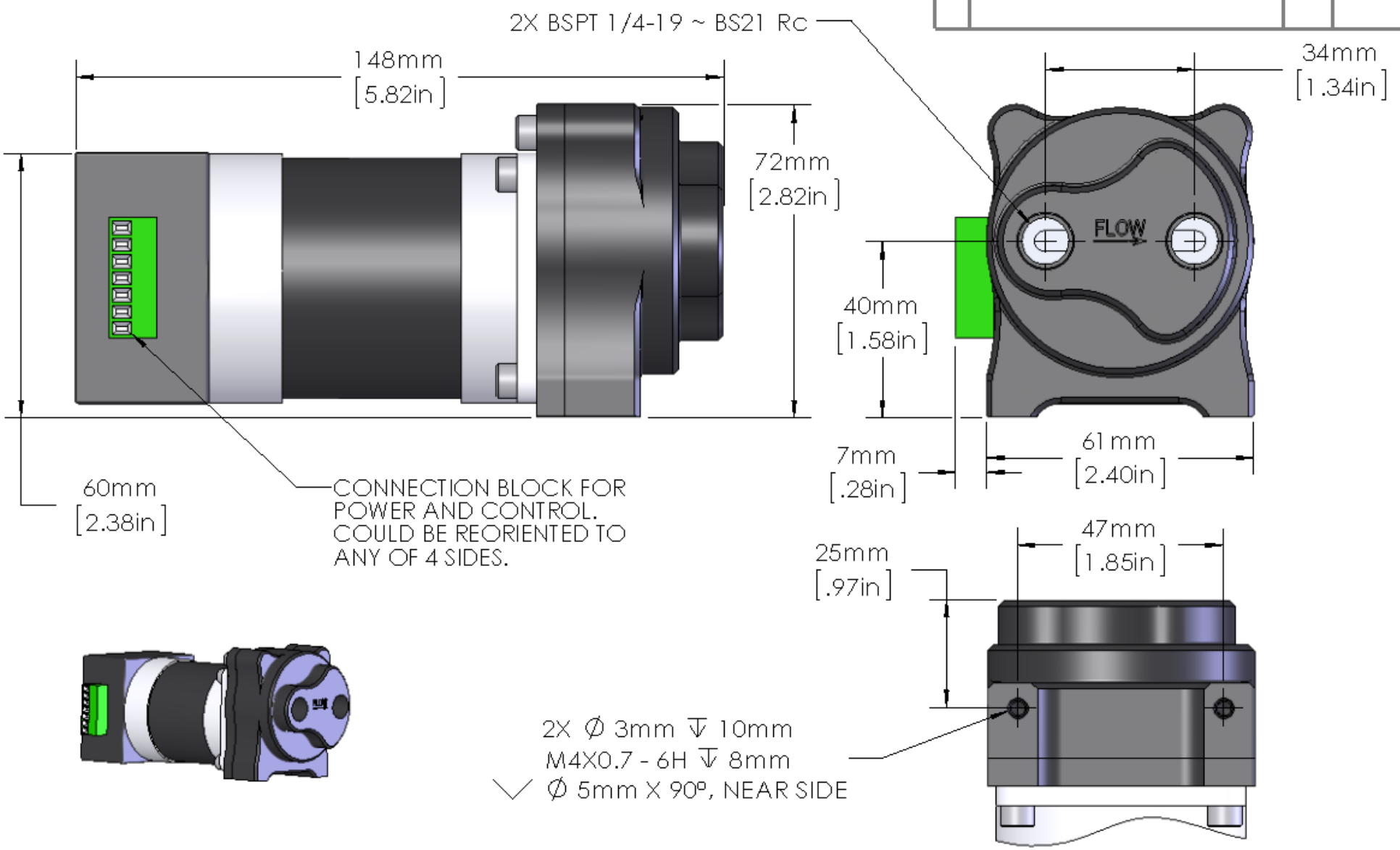
Application Examples

1. For a system that once set up always runs the same speed and flow, a pair of resistors is used to create a voltage divider to set the voltage at pin 5 Vspeed to hold the pump at a given speed. If we wanted to set the pump speed for 300 mL/min that would be ¾ of the pumps 400mL/min rated speed so a good place to start would be with an R1 resistance value of 1.5k ohms and R2 with a value of 4k ohms. This will set the voltage at pin 5 to 3.75vdc or ¾ of the 0 to 5 range for pin 5. The pump will then run at ¾ of max speed. If the flow does not come out quite right, R2 can be replaced with a slightly higher value resistor to make the pump run a little faster or a lower value to make the pump run slower.
2. For a system that requires a manually adjustable flow rate to be held once set. A potentiometer or ‘pot’ acts much like the voltage divider described above but the two resistance values can be adjusted with a dial to manually set the flow rate to match system requirements.
3. A system where precise flow rate is required can be set up with a closed loop between the pump and a flow meter. With an amplifier driving pin 5 Vspeed driven from the flow meter output, pump speed is varied as needed to maintain steady flow rate.
4. A system where precise pressure is needed can also be set up, this time with a closed loop between a pressure transducer and the pump. The transducer signal is used to drive an amplifier, which in turn drives pin 5 Vspeed such that the pump speed adjusts to hold the set pressure.

Application Engineering

It is challenging to address every possible installation type. We are always happy to help in choosing an appropriate installation setup. Give us a call for engineering assistance and support. 888-676-7774

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED



NOTES:
Gear Pump with brushless DC motor complete with motor driver electronics.

Material: ---	Transportation Research Corp. (TRC) VARNA Products		Voice: 530-676-7770 Fax: 530-676-7796
Approvals	Date	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: X = ± .030 XX = ± .015 XXX = ± .005 ANGLES = ± .5° FINISHES INDICATED ARE MAXIMUM VALUES	TG-300 Pump
DWN. TBMJr	09/27/11		
ECEA #			Part No. 6999 Rev. A
SCALE:4:5			