

Levitronix closed-loop system for better process control



Levitronix has designed the closed-loop flow control system to offer the following benefits:

- Closed-loop flow control system
- Precise liquid flow control
 - Precise pump speed control capability
 - Flow accuracy defined by external flowmeter(Optional)
- High control dynamics
 - High pump dynamics
 - Closed loop flow control dynamic dependant on flowmeter
- Alarming capability for flow, speed,current,temperature, line clogging
- Dynamic Condition Trending(DCT) capability
(enables failure prediction and scheduling of preventive maintenance)
- Continuous smooth process flow (no pulsation)
- Independent from pressure on liquid delivery line
(no minimum pressure required)
- Chemical saving based on reduced chemical flow rate
- Low cost of ownership and reduced maintenance costs
(Prolong filter life time)
- Higher Yield

- No polymer particles
- Better process control

Dynamic Condition Trending (DCT)

The system provides an actual flow signal and a *Flow Alarm*, whenever actual and reference flow don't correspond. So low flow conditions are detected, for example caused by line clogging. In addition a *Trend Warning* is provided, which enables failure prediction and scheduling of preventive maintenance. This so-called *Dynamic Condition Trending (DCT)* feature is based on pump speed information. *Figure 3* basically describes the function of this feature.

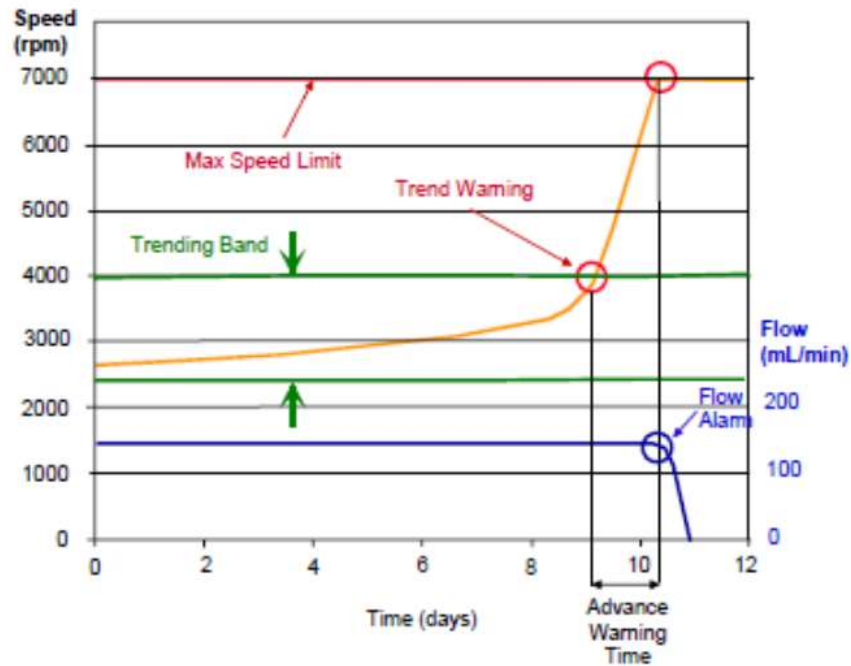


Figure 3: Dynamic Condition Trending (DCT) of Levitronix Flow Control System

The *Trend Warning* is some kind of advance warning. A warning on potential line-clogging is generated. The *Trend Warning* information is given by the pump speed.

Example: The flow control system is usually running with a pump speed of 2800 rpm for providing 150 mL/min (maximum pump speed is 7000 rpm). If any component starts clogging (e.g. filter) the pressure drop in the loop is increasing, which means pump speed is slowly ramping up to provide the set flow of 150 mL/min. So if pump speed exceeds 4000 rpm, the system provides a *Trend Warning*. The system is still able to provide the desired flow rate (there are still 3000 rpm until maximum speed is reached) but there might be an issue in the future. That gives time to schedule a preventive maintenance action. (All above mentioned parameters are configurable).