

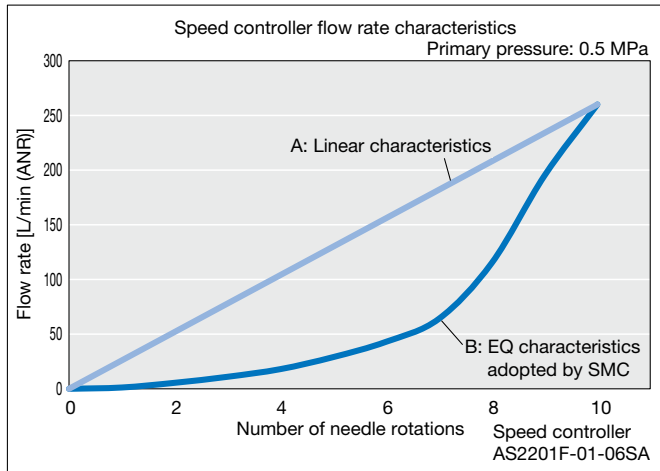
# Speed Controller Flow Rate Characteristics



## What are the EQ type flow characteristics?

The EQ type flow characteristics (Equal percent characteristics):

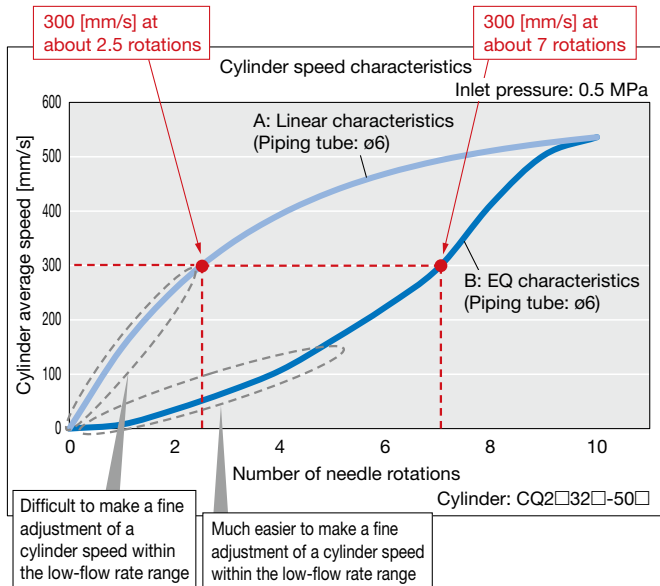
The smaller the needle opening angle is, the less the flow rate increases; the larger the needle opening angle is, the more the flow rate increases.



- As the cylinder speed is proportional to the effective area, it would make sense to think that the linear type flow characteristics (A) is better; however, SMC speed controllers have adopted the EQ type flow characteristics (B).

## A fine flow rate adjustment is possible with the EQ type speed controllers.

- Needle rotations for the linear type speed controllers: Adjustable within 0 to about 2.5 rotations
- Needle rotations for the EQ type speed controllers: Adjustable within 0 to **about 7 rotations**



### Advantages of the EQ type speed controllers:

- The graph on the left shows that the number of needle rotations and the cylinder speed are nearly linear and that the cylinder speed control is better.
- Much easier to make a fine adjustment of a cylinder speed within the low-flow rate range

\* When a speed controller is connected to the cylinder for speed adjustment, the cylinder's speed is actually determined by the combined effective areas of the tubing, fittings, solenoid valves, and silencers. Therefore, using an EQ type speed controller allows for greater control over the cylinder speed.

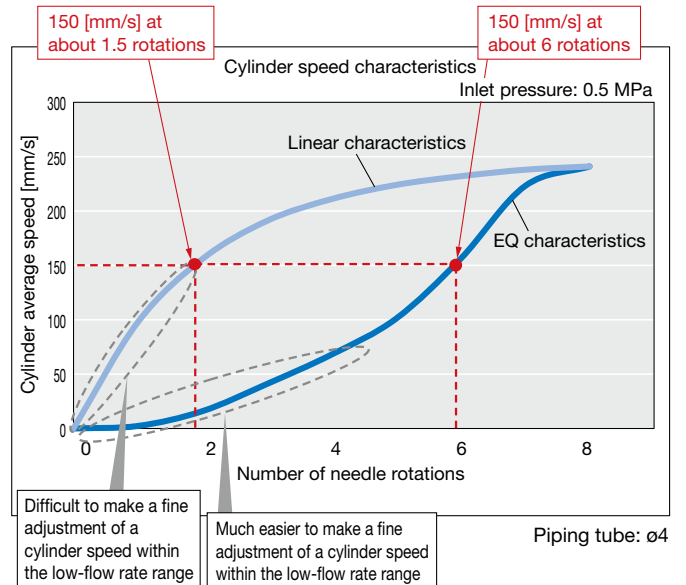
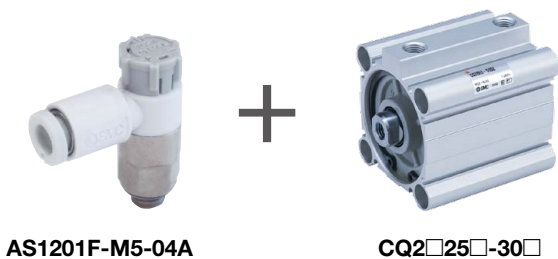
## In cases where the linear type flow characteristics are superior

When the cylinder is adjusted within a low-speed area, it is not likely affected by tubing, fittings, solenoid valve, and silencers, so the linear characteristics become superior. The SMC's **Low-speed control type** speed controllers have adopted the linear type flow characteristics.

**Actual cases** A fine flow rate adjustment is possible with the EQ type speed controllers.

When using a  $\varnothing 4$  piping tube, a cylinder bore size of  $\varnothing 25$ , a 30 mm stroke, and adjusting the speed within the 0 to 150 mm/s range

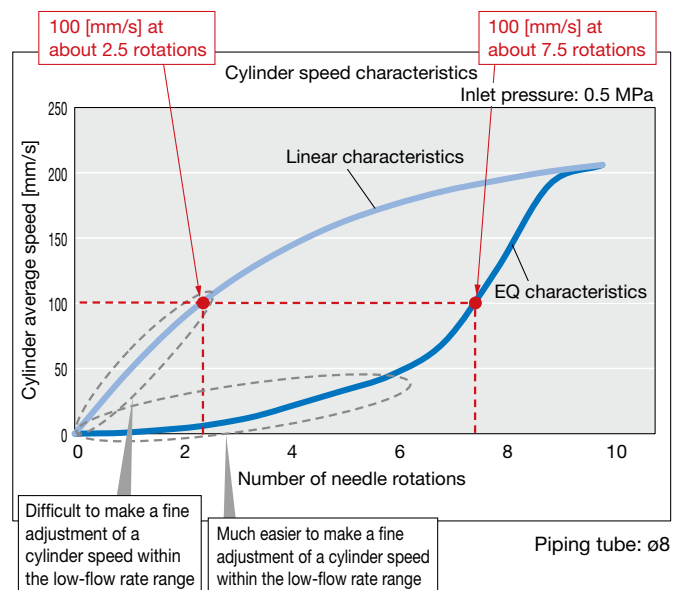
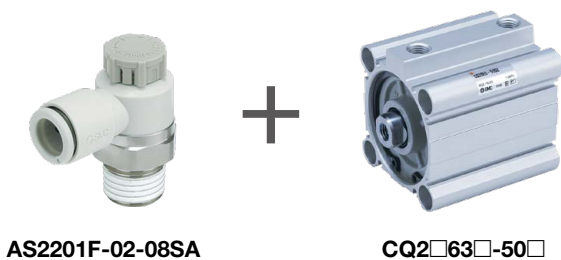
- Needle rotations for the linear type speed controllers:  
**Adjustable within 0 to about 1.5 rotations**
- Needle rotations for the EQ type speed controllers:  
**Adjustable within 0 to about 6 rotations**



\* Calculated using SMC's Pneumatic Equipment Model Selection Software

When using a  $\varnothing 8$  piping tube, a cylinder bore size of  $\varnothing 63$ , a 50 mm stroke, and adjusting the speed within the 0 to 100 mm/s range

- Needle rotations for the linear type speed controllers:  
**Adjustable within 0 to about 2.5 rotations**
- Needle rotations for the EQ type speed controllers:  
**Adjustable within 0 to about 7.5 rotations**



\* Calculated using SMC's Pneumatic Equipment Model Selection Software