

Suggestion of Holderless for Automobile application

Do you know a Holderless Brush?

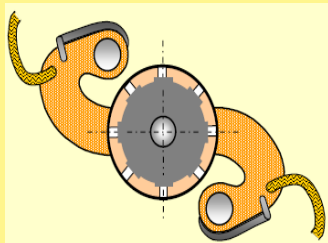
This is used in a part of the motor which specification is lo'

The merits of Holderless are following three points.

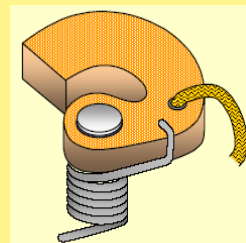
- ① Cost down is expected because of simplification of bracket shape and reducing the number of con
- ② It contributes to minimization of the motor because it makes possible to reduce thickness of brack
- ③ It makes possible to reduce mechanical noise since there would be no oscillate by clearance betw

The Controversial points for Holderless about the Automobile.

- ① It's needed to fix a pin into a brush directly. Therefore there is a limit reg
 ⇒ The material which is suitable for Automobile, it becomes tender. Thus there is an anxiety
- ② In case of high revolution, the vibration would be large by clearance between brush
 ⇒ There is concern about sliding instability because of wear of hole of the brush and increase the



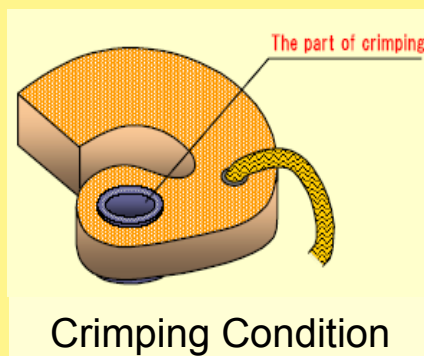
Brush Position



Brush Ass'y

Our company cleared for all these concerns.

- ① Provide the Brush crimped the bush made of resin into the hole of Brush. Minimum brush strength is enough because of this resin pin, it makes freely of the limit of material.
 ⇒ It makes possible to reduce spark and quietness by sliding stability with material.
- ② To reduce friction between Pin and Brush by using resin which is low coefficient of friction, it makes possible to improve mechanical noise.
 ⇒ It makes possible to reduce mechanical noise which is occurring caused by friction between Pin and Brush.
- ③ Brush wear would be not occur because Pin and Brush are not contact directly. Therefore there is not influence for sliding by wear of brush hole area.
 ⇒ It makes possible to keep stability sliding condition.



Crimping Condition