GMX001 Lock Module Detent in RUN

First Design Concept

- Detent between lock cover and cam shaft:
GMX001 Lock Module Detent in RUN

- Design Evaluation (Engineering and Cost)
  - The most preferred by supplier

<table>
<thead>
<tr>
<th>Engineering</th>
<th>Cost &amp; Timing</th>
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</thead>
<tbody>
<tr>
<td>Benefits</td>
<td>Concerns</td>
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</table>
| No interface tuning required (between lock housing and cylinder) | - A few new components are needed  
- Torque specification needed by supplier | Piece Cost Increase | Tooling | Lead Time |
|             | $0.5716      | 179143 (new tooling) | About 1 year |
Second Design Concept

- Adding a plastic sleeve to the lock housing-lock cylinder interface:
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- Design Evaluation
  - Main concern with trimming of the lock housing to accommodate plastic sleeve

GMT 257 UG Data Shown

Material thickness creates concern for GMX001 lock hosing
## GMX001 Lock Module Detent in RUN

### Design Evaluation (Engineering and Cost)

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| Design concept already proven to work for GMT257 | - Not enough material to trim from the lock housing in order to accommodate sleeve.  
- Simultaneous tuning effort from lock cylinder engineering and lock housing supplier  
- No specification available | $0.2758 | $152,145 (new tooling) | About 1 year |
Other Design Solution Discussed (Ruled out)

- Adding spring loaded pins to the lock housing:
  - Main concern with complexity in warranty.
  - Ruled out by lock housing supplier
Other Design Solution Discussed (Ruled out)

- Changing the slot in the key in order to reduce lever arm and thus the torque:

- It was determined that the lever arm still present due to the fob ring.
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Other Design Solution Discussed (Ruled out)

- PK3+ Detent Investigation (Direction from last CPIT meeting)
  - It was determined PK3+ detent is not related to the locking mechanism detent
Conclusion (Best Solutions)

- Modification of the lock housing cam shaft seems to be the most feasible and the preferred one by supplier.
  - Concern with the higher price increase
  - Concern with lack of specification
- Adding a plastic sleeve to the lock housing-to-cylinder interface.
  - Concern with the material thickness of the lock housing
  - Concern with the lock housing-lock cylinder tuning coordination between two suppliers
  - No specification available