

**From:** Raymond DeGiorgio  
**To:** Joseph Joshua  
**CC:** Arnaud Dessirieux; David M. Trush  
**BCC:**  
**Sent Date:** 2005-03-07 14:59:03:000  
**Received Date:** 2005-03-07 14:59:07:000  
**Subject:** Re:Torque Study ----- X001 Ign Cylinder rotation effort  
**Attachments:** GMX001 Lock Module Detent in RUN 20050216.ppt

Joe,  
Here is some load measurements taken late last year on a few Cobolt Captured Test Fleet Vehicles. (I hope this will suffice.) This study measures the whole system as we have it today in the GMX 357/ X001 Platforms.

A digital force gage was used to measure the effort required to rotate the key Counter Clockwise to the RUN position. Two measurements were made one Normal to the key and the other perpendicular to the key face. The data suggests that the present Key/Lock Housing/ Ignition Switch System is capable of retaining an approximately a ONE Pound Static load. If additional load requirements are needed a complete revalidation of the lock housing/key cylinder switch assembly will be required. Lead time for this revalidation is 16 weeks minimum.

**Note:**  
This load is equivalent to hanging a "Can of Campbell Soup" off the key chain. A proposal should be made to the customers to use minimal number of keys on their key chain. This suggestion is being done currently by another OEM for their vehicle.

## Cobolt - Key Torque Study Captured Fleet Vehicles

Vehicle Number	Force in Nutons	
	Normal	Perpendicular
15AP4265	4.1	4.3
15AP4307	4.5	4.3
15AP 4043	4.5	4.3
15AP4090	4.3	4.2
15AP4275	4.5	4.0
15AP4207	5.5	4.9
15AP4214	5.1	4.6
15AP4287	4.5	3.8
15AP4264	4.8	4.0

Any questions, feel free to contact me at [REDACTED]

Regards,  
Ray DeGiorgio

Raymond DeGiorgio  
[REDACTED]

Joseph Joshua

Joseph Joshua  
02/25/2005 12:03 PM

To: David M. Trush/US/GM/GMC [REDACTED] Raymond DeGiorgio/US/GM/GMC [REDACTED]  
cc: Arnaud Dessirieux/US/GM/GMC [REDACTED] Blendi Sultaj/US/GM/GMC [REDACTED]  
Subject: X001 Ign Cylinder rotation effort

Hi Dave/Ray:

Attached is Blendi's presentation that was made at CPIT last week and that will be visited at VAPIR on 3/1.  
Please feel free to send me a slide regarding the feasibility of the key slot change and one for the plan on the future ign switch.  
Appearing below is the VAPIR invitation. Hope you two can make it.  
I will forward the final presentation to Chris Ritter on Monday afternoon.

Thank you

**Joe Joshua**  
Lead Engineer -Steering System  
GMMT 001, GNT 315, GMX 357  
[REDACTED]

GMX001 Lock Module Detent in RUN 20050216.ppt

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Chris M Ritter  
02/25/2005 09:59 AM  
fyi  
----- Forwarded by Scott  
Sherman/US/GM/GMC on 02/25/2005  
10:11 AM -----

To: Shu Chung/US/GM/GMC [REDACTED] Michael J Smith/US/GM/GMC [REDACTED] Thomas Lieblein/US/GM/GMC [REDACTED] John C. Lu  
Deyer/US/GM/GMC [REDACTED] Thomas Duffield/US/GM/GMC [REDACTED] Scott Sherman/US/GM/GMC [REDACTED] Joseph Fannon/US/GM/GM  
VAPIR  
cc:  
Subject: Meeting Notice - X001 VAPIR 3-1-05

PRTS Champions - It is the expectation that you attend to raise the roadblocks that have kept the issues from moving cost save items since those are also showing up on the Kruse/Tsien >100 day reviews.

I have added the following GMM EGMs to the distribution. Please let me know if you are not the correct person to send

Anita M. Burke/MX/GM/GMC

Oscar Marin/MX/GM/GMC  
 Humberto Morales/MX/GM/GMC  
 Miguel Perez/MX/GM/GMC  
 Hector Castro/US/GM/GMC  
 Jose Leandro Nieto/MX/GM/GMC  
 Ramon Zaragoza/MX/GM/GMC  
 Victor Urban Uricles/MX/GM/GMC  
 Ricardo Guerrero/MX/GM/GMC

GMX001 VAPIR Meeting  
 March 1, 2005 7:30 - 9:00

Meet Me Line [REDACTED] Participant: [REDACTED]

TIME	SUBJECT	PRESENTER	I/D
7:30	PPO Update	Konzen	I
7:45	Program Update	Altman	I
7:55	VTS Reconciliation	Manzor	I
8:15	PRTS >= 45 Days in RC or Solution	Champions	D See below
8:40	CR Review	Ritter	I/D
8:50	Roundtable		

Project No.	Days Open	Issue No.	Issue Type	Status	Severity Code	Subject	CU
05X001	154	NI 68513	Launch	Root Cause	\$	Radiator Assembly, A/C Condenser and Engine Cool Fan - Replace current 3 plate aluminum HPOC TOC. Supplier Suggestion 33863	Mayberry, Thermal (T Epsilon)
06X001	123	NI 70797	re - Phy Build	Solution	3	Acoustic Cover - Engine, Engine - loose / vibration	Chung, Sr (Management Delivery)
05X001	84	NI 71799	Launch	Solution	\$	Mat. Room - Cost savings	Smith, Mic (Acoustics)
05X001 Coupe	84	NI 72146	Launch	Solution	3	Front Fender Assembly, Right front Fender Upper Attaching Points - Corrosion Concern	Lieblein, Tr (Closures ** Closures)
05X001	84	NI 72979	Launch	Solution	2	Clean air duct, @ air box or throttle body - Not fully seated - sets P171 / MIL on IP	Lukavitz (Controls - Induction)
05X001	70	NI 73620	Launch	Solution	3	Plate Asm, Rt S/D Actry Sw Mt - Separated	Deyer, Les (Trim System)
05X001	70	NI 73631	Launch	Root Cause	4	Door Trim Asm, Doors - Door Trim Amrest bolster material doesn't meet Cold Impact requirements	Deyer, Les (Trim System)
05X001	50	NI 74202	Launch	Solution	4	Seat Belt Adjustable Guide Loop Button, Slider Track - Button Can slide off assembly	Duffield, Tr (Labels ***)
05X001	49	NI 72404	Launch	Solution	3	Ignition Key Cylinder Assembly, Column - Steering - vehicle can be keyed off with knee while driving	Sherman, (Women) * (Integral St)
05X001 Sedan	49	NI 74174	Launch	Solution	3	Handle Asm-RR S/D, Pawl for cable attachment - pawl for the inside handle cable attachment broke	Fannon, Jr (*** Closures)
05X001 Coupe	49	NI 74205	Launch	Solution	3	Seat belt, front Right and Left - Poor Seat belt Retraction	Duffield, Tr (Labels ***)





# GMX001 Lock Module Detent in RUN

## ➤ Design Evaluation (Engineering and Cost)

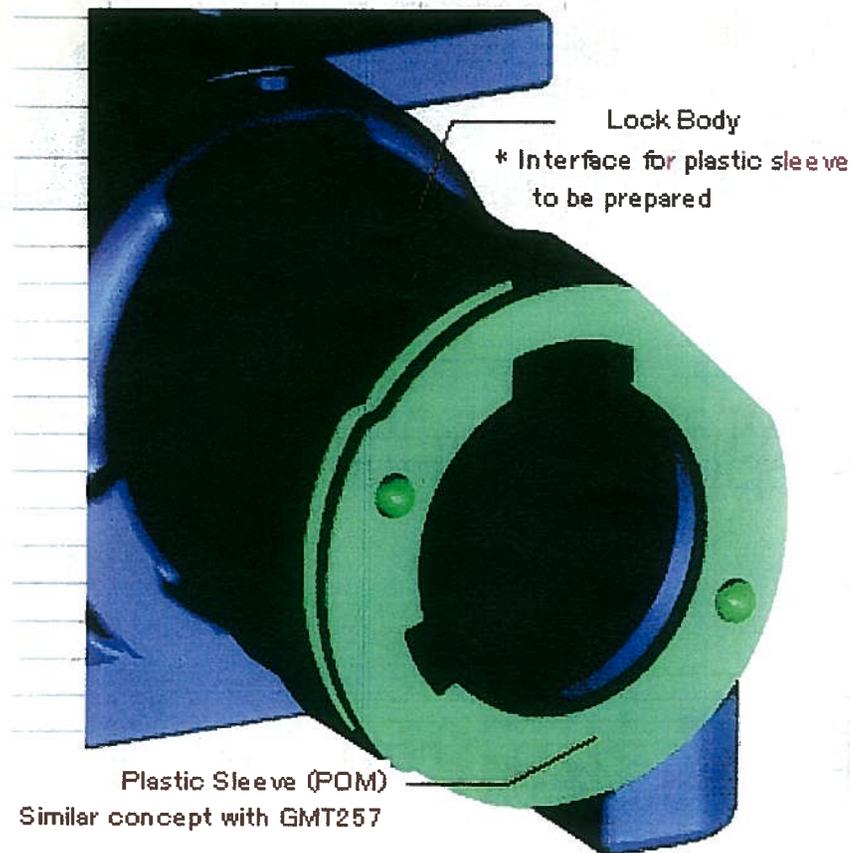
- The most preferred by supplier

<b>Engineering</b>		<b>Cost &amp; Timing</b>		
<b>Benefits</b>	<b>Concerns</b>	<b>Piece Cost Increase</b>	<b>Tooling</b>	<b>Lead Time</b>
No interface tuning required (between lock housing and cylinder)	-A few new components are needed - Torque specification needed by supplier	\$0.5716	179143 (new tooling)	About 1 year

# GMX001 Lock Module Detent in RUN

## *Second Design Concept*

- Adding a plastic sleeve to the lock housing-lock cylinder interface:

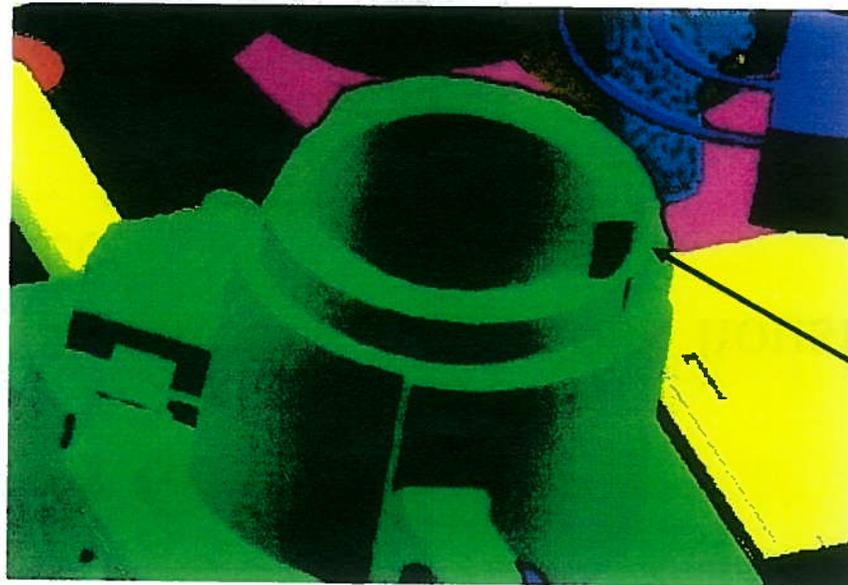


# GMX001 Lock Module Detent in RUN

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## ➤ Design Evaluation

- Main concern with trimming of the lock housing to accommodate plastic sleeve



Material thickness  
creates concern for  
GMX001 lock hosing

GMT 257 UG Data Shown

# GMX001 Lock Module Detent in RUN

## ➤ Design Evaluation (Engineering and Cost)

<b>Engineering</b>		<b>Cost &amp; Timing</b>		
<b>Benefits</b>	<b>Concerns</b>	<b>Piece Cost Increase</b>	<b>Tooling</b>	<b>Lead Time</b>
Design concept already proven to work for GMT257	<ul style="list-style-type: none"><li>- Not enough material to trim from the lock housing in order to accommodate sleeve.</li><li>- Simultaneous tuning effort from lock cylinder engineering and lock housing supplier</li><li>- No specification available</li></ul>	\$0.2758	\$152,145 (new tooling)	About 1 year

# GMX001 Lock Module Detent in RUN

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## *Other Design Solution Discussed (Ruled out)*

- Adding spring loaded pins to the lock housing:

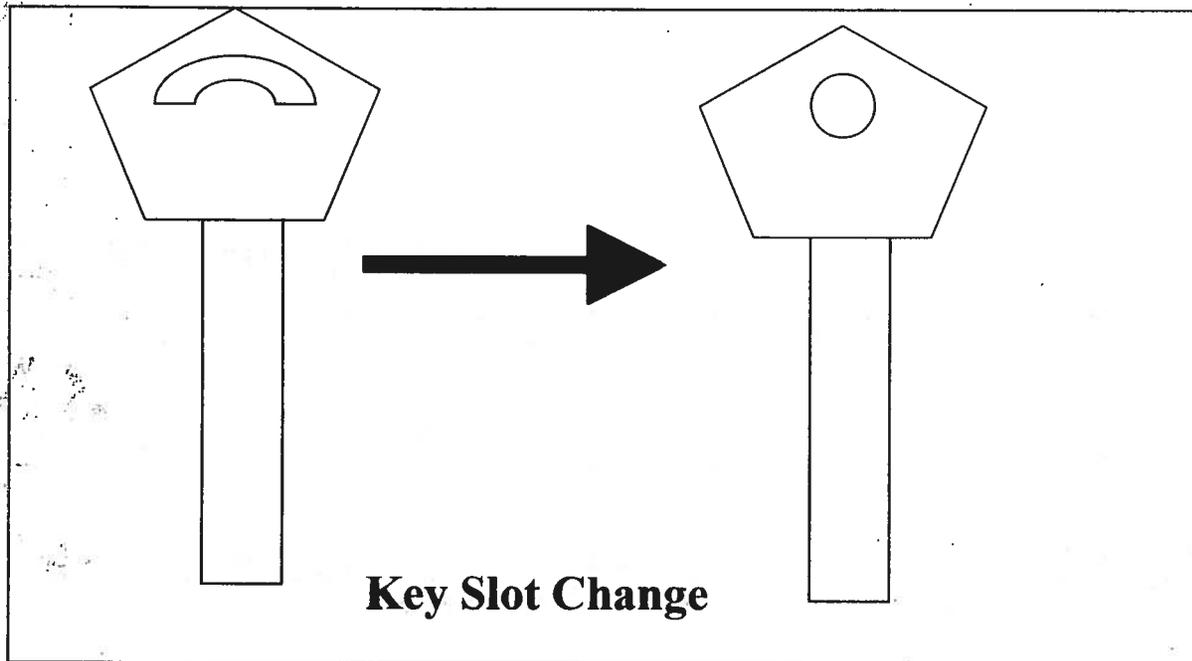


- Main concern with complexity in warranty.
- Ruled out by lock housing supplier

# GMX001 Lock Module Detent in RUN

## *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.

# **GMX001 Lock Module Detent in RUN**

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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

# GMX001 Lock Module Detent in RUN

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## *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