

Attachment #8

QIS #SHJA-071012-01

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HONDA
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B: Supplier

QUALITY IMPROVEMENT SHEET (Q.I.S.)

Issued by:
HAM M.Q.

Page 1

COUNTERMEASURE CONTROL # SHJA-071012-01		RESPONSIBLE PLANT AND DEPARTMENT Honda Mfg. Alabama 5190 AUTO PARTS QUALITY		RANK B
INFO ID WAR-206608-266243		A. H. NUMBER 2		INFORMATION SOURCE Warranty Claim
ODOMETER 26 mi		SUPPLIER STABILUS		VIN [REDACTED]
MARKET INFORMATION ISSUER [REDACTED]		MARKET QUALITY ISSUER [REDACTED]		ENGINE NUMBER [REDACTED]
[REDACTED]		[REDACTED]		TRANSMISSION NUMBER [REDACTED]
PRIMARY FAILED PART NUMBER AND DESCRIPTION			RELATED A.H. TECHLINE CODE 8000: BODY GENERAL	
PRIMARY CAUSAL PART NUMBER AND DESCRIPTION			PRIMARY RELATED WARRANTY CLASS	
DEALER/STATE 206608 VA	TITLE Odyssey Tailgate Open Stay Failure			
PRODUCTION DATE 07/07/18	OCCURRENCE DESCRIPTION Customers find the tailgate will not stay up. Dealers replace the tailgate stay(s) to repair.			
SALES DATE 07/08/04				
OCCURRENCE DATE 07/08/02	MARKET INFORMATION INVESTIGATION [REDACTED]			
MQ RECEIVE DATE 07/08/23				
THEME UP DATE 07/10/12				
ANALYSIS RECEIVE DATE 07/10/23				
CAUSE ANALYSIS APPROVAL DATE 07/10/31	MARKET QUALITY CAUSE ANALYSIS There appears to be no improvement in failure trend since the countermeasures from the last QIS were implemented. QA requests that PQ investigate failures with the supplier. QA has received 16 warranty parts from vehicles produced after the last c/m. Of these 16 parts, 4 units had before c/m parts. After a c/m has been implemented by the supplier, QA requests that PQ work with supplier and purchasing to determine how many parts are in HMA safety stock cages, supplier's inventory, and on order for production at HMA. QA will work with AH to determine how many before c/m parts are being used for service parts. QA will use these inventory counts to determine if it is better to use these before c/m parts or to scrap them.			
RESPONSIBLE DPT ISSUE DATE 07/11/02				
COUNTERMEASURE REPLY DATE 08/02/05				
1st COUNTERMEASURE APPLICATION DATE 07/03/26				
Finish Date 08/10/09				
VIEW BEFORE COUNTERMEASURE		VIEW AFTER COUNTERMEASURE		

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Page 2

QUALITY IMPROVEMENT SHEET (Q.I.S.)

RESPONSIBLE DEPARTMENT CAUSE ANALYSIS				COUNTERMEASURE BY	
There were 78 parts returned to Stabilus for this QIS for analysis. - 5 were found to be due to damage from the customer. - 8 were found to have "bullet damage" due to misassembly of the seal to the rod in Stabilus process. - 14 were found to have a rod defect from the raw material supplier. - 51 were found to have rod to piston package concentricity out of spec causing the "side loading" failures.				07/12/04	
				COUNTERMEASURE CONTROL # SHJA-071012-01	
COUNTERMEASURE CONTENTS				SOLD PRODUCT TREATMENT	
- For the torn seal due to "bullet damage", the steel "bullet" was replaced with a plastic one made of Delrin. This was applied at STMX on 4/15/07 lot # 120/07 arrived at HMA on 5/13/07. - For the side load scratches which due to rod to piston concentricity, the C/M was to change the S/U instructions to include the use of a gauge block to ensure proper riveting. This was applied on 03/30/07 at STMX and applied to lot# 093/07 arrived at HMA on 04/16/07. However, a hard C/M was applied to the rivetting machines of eliminating the pusher and nest to a set of grippers that hold the rod to ensure proper CC during rivetting. This was applied at STMX on 02/22/08 but due to no receipt of IPP tags, a FGV is estimated at 04/01/08. It was confirmed that after C/M lot dates were on line at this time. - There were two types of material defects in the rods that were found - voids and laps/seams. Both of these were due to slag getting into the material during processing at the raw material supplier. STMX installed their C/M of locking out the Eddy current reject box on 03/09/07 lot # 071/07 arrived at HMA on 03/25/07. - The sub-supplier replaced the forks on their forklifts from square to round to prevent handling damage on 08/10/07. They also replaced their EC head on 8/14 and re-trained their operators. They changed the material offload spool feed angle from 45 to 0 degrees on 08/17/07 to eliminate				AH: NORMAL WARRANTY	
				CH: NORMAL WARRANTY	
				JH:	
				EH: NORMAL WARRANTY	
				OTHERS: NORMAL WARRANTY	
COUNTERMEASURE APPLICATION INFORMATION				STOCKED PRODUCT TREATMENT	
				NO TREATMENT	
				PART STOCK CHANGE	
				NO CHANGE	
				AFTER SERVICE PART NUMBER	
				SERVICE BULLETIN NUMBER	
				DESIGN CHANGE NUMBER	
C/M TYPE	VEHICLE IDENTIFICATION NUMBER	C/M APPLICATION DATE	ENGINE NUMBER	TRANSMISSION NUMBER	NOTES
HARD		08/04/02			VIN Finder
HARD		08/04/01			VIN Finder
HARD		08/04/01			VIN Finder
HARD		08/04/01			CC CM Grippers Added
HARD		08/04/01			VIN Finder
HARD		08/04/01			CC CM grippers added
HARD		08/04/01			VIN Finder
HARD		08/01/07			VIN Finder
HARD		08/01/04			VIN Finder
HARD		08/01/02			VIN Finder
HARD		07/12/21			VIN Finder
HARD		07/12/20			VIN Finder
RECOMMENDED FIELD ACTION Normal warranty.					
COUNTERMEASURE EFFECTIVENESS Monitor warranty.					
RECOGNITION SIGNATURES					
CHIEF ENGINEER	MQ MANAGER	MQ STAFF ENGINEER		RESPONSIBLE DEPT. MANAGER	
		REPLY	ISSUE		

Attachment #10

05M - 07M Odyssey

PTG Open Stay problem summary

HMA

11-3-08

CONFIDENTIAL BUSINESS INFORMATION

■ Problem outline

Contention: Tailgate doesn't hold/sags.
Problem on CBU: Can't hold tailgate due to lowered open stay reaction force.
Problem cause: **[1]** Gas leak due to rod scratch
[2] Contamination during manufacturing process
[3] Stud bold weld location shifted

[4]- ① Seal installation tool ("bullet") was damaged.
 - ② Piston package concentricity out of spec
 - ③ Material defects in the rod (voids and laps/seams)

Part name: 74820-SHJ-A612-M1 Open stay Assy
Supplier: Stabilus
Mfg location: Stabilus Mexican plant

Number of claims and defect rate by model year

(As of 10/24/08)

MODEL	2005MY	2006MY	2007MY	Total
Sales	27,089	25,900	22,580	75,569
Claims	██████████	██████████	██████████	██████████
Defect%	██████████	██████████	██████████	██████████

■ **Warranty** [Cum Defect%]

Replace Part# : 74820-SHJ-A61 (PTG Type)

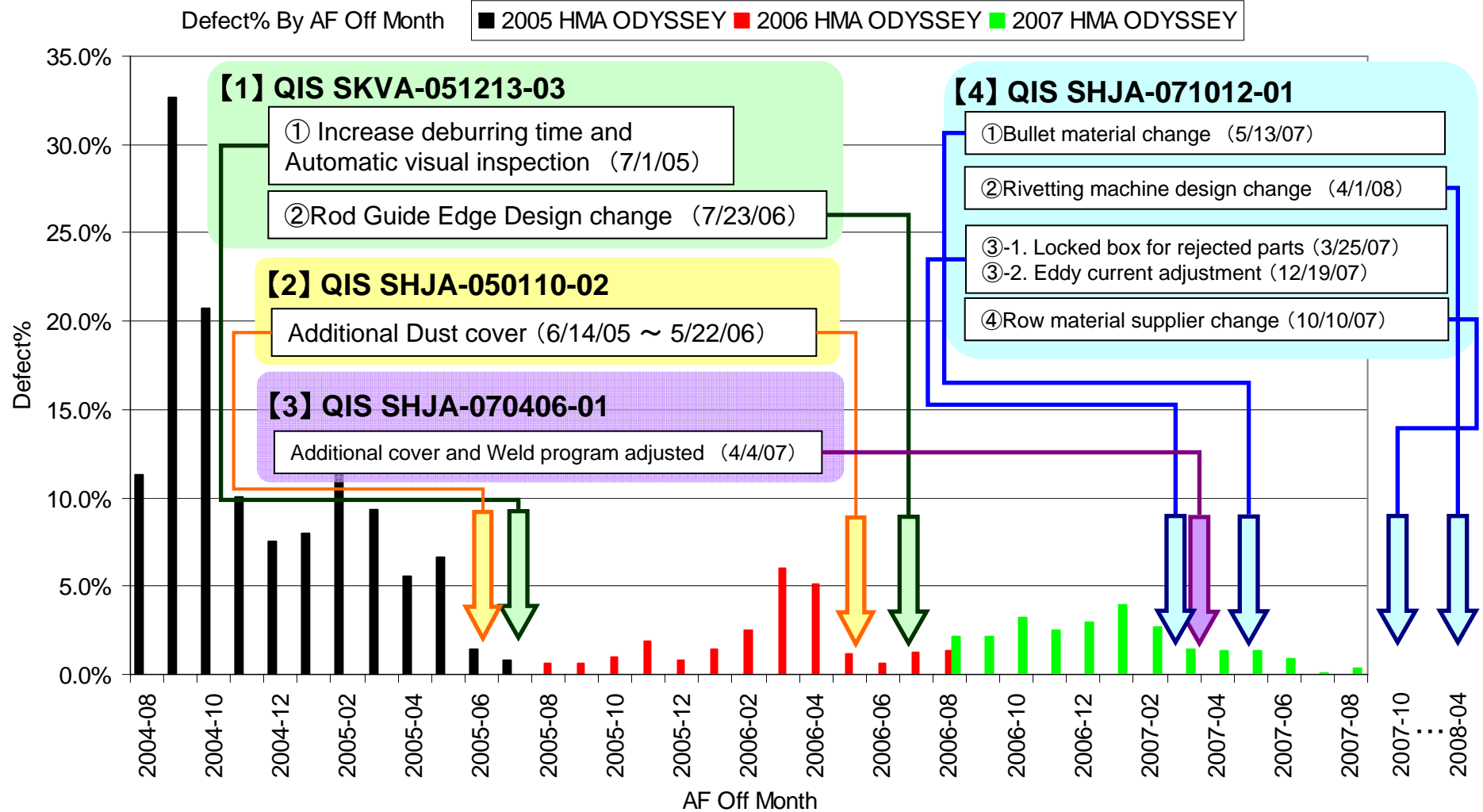
Data 10-24-08



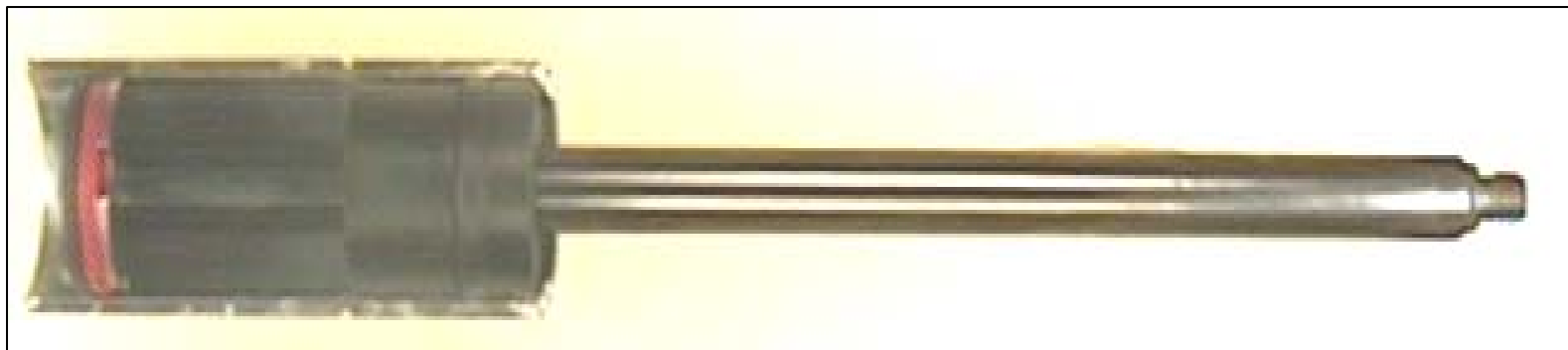
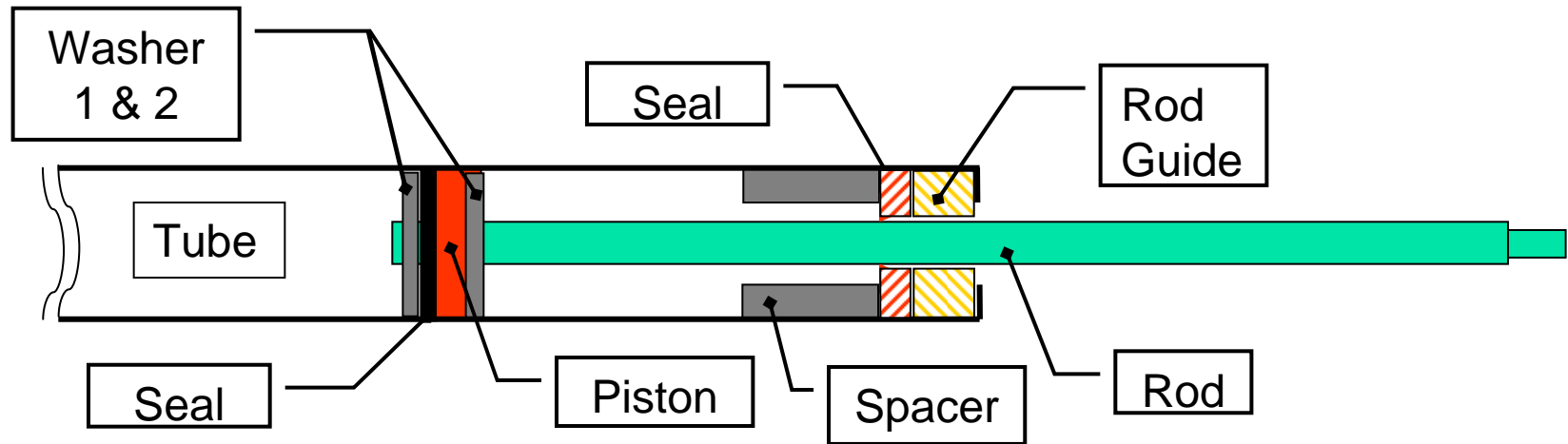
Warranty [Defect% by AF off month] & C/M Applied date

Replace Part# : 74820-SHJ-A61 (PTG Type)

Data 10-24-08



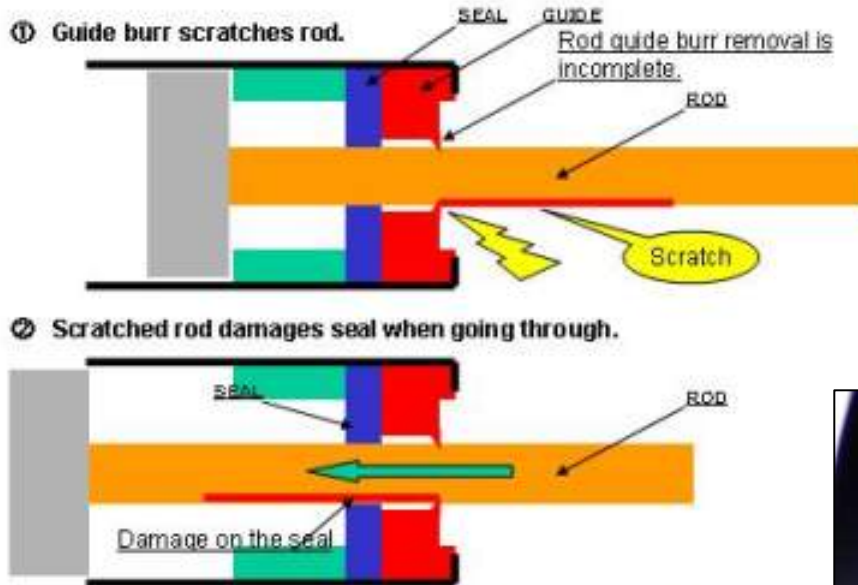
SHJ Open Stay Diagram



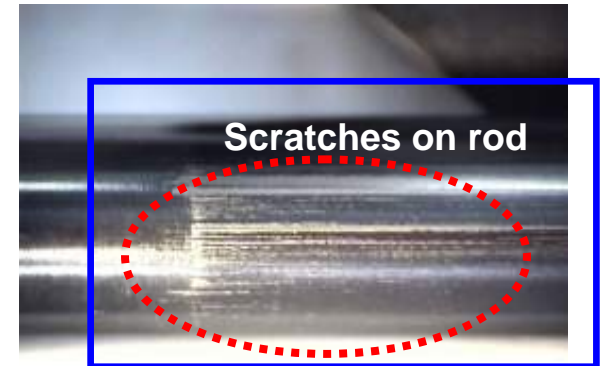
[1]QIS SKVA-051213-03 –①

■ Cause Rod Guide Burr Defect

- Scratches on rod (due to rod guide burr and side-loading) lead to seal damage.
- Seal damage causes open stay failure.



Root cause is rod guide manufacturing defect (burr).



SUPPLIER RECREATION TESTING:
First scratch was found after 250 cycle.
Gas/oil leak was confirmed after 1000 cycle.
Gas pressure went down to 53%.
The scratch was 0.4 μm deep and 0.1 mm wide maximum.

■ C/M

Increase burr removal time from 6 min to 18 min and add automated visual check

[1]QIS SKVA-051213-03 —①

■ Burring removal process



Pre de-burring machine



material basket

Total de-burring time
Increase from 6 to 18 min



Final de-burring machine



material basket



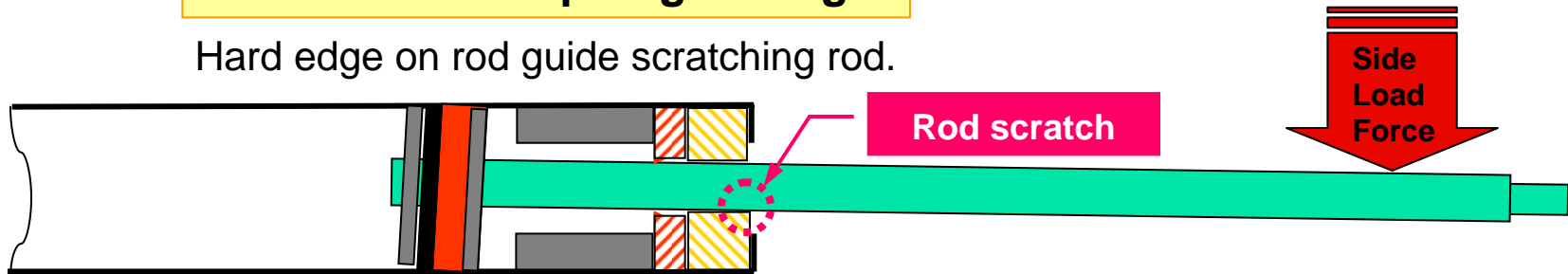
mix particle made by
cherry kernels

[1]QIS SKVA-051213-03 –②

■ Cause

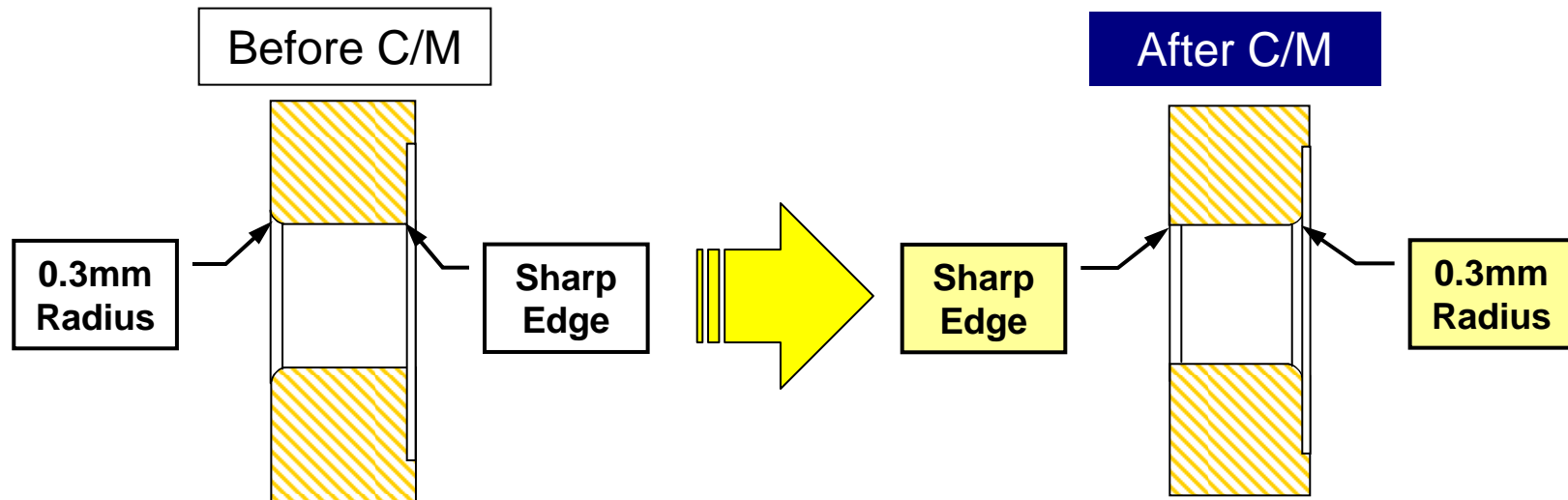
Rod Guide Sharp Edge Design

Hard edge on rod guide scratching rod.



■ C/M

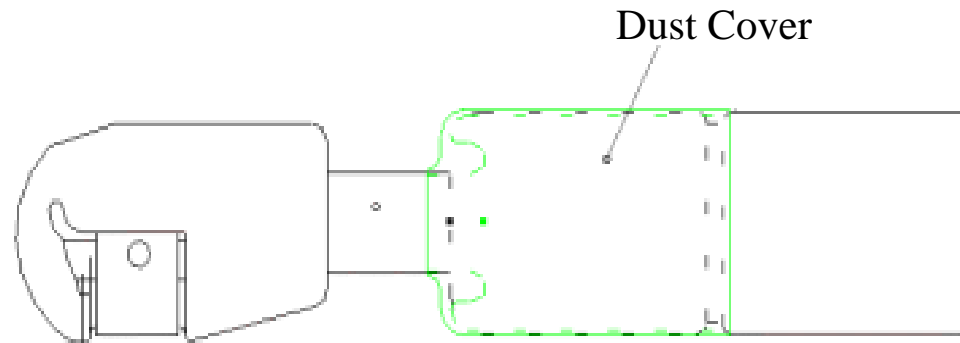
Rod guide edge design change



[2]QIS SHJA-050110-02

■ Cause

Contaminant entry into seal area



■ C/M

Dust cover applied (same as S0X design) by MI

But dust cover was deemed ineffective for decreasing warranty claims and was discontinued.

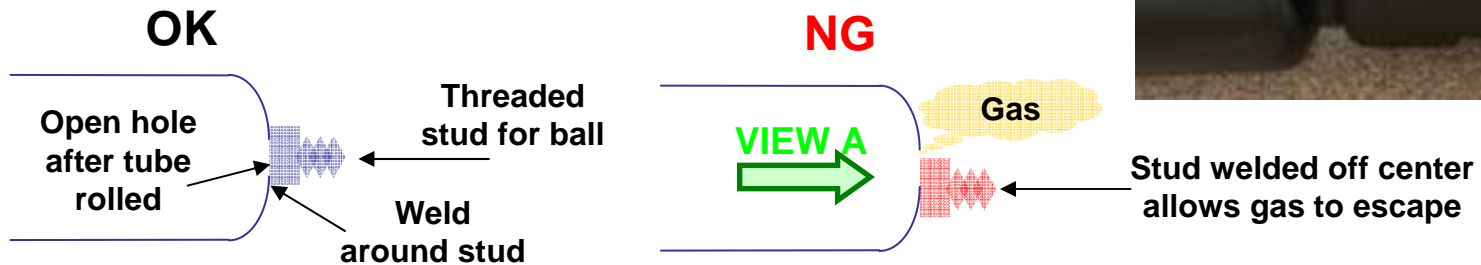
**Apply dust cover : MI XD5-2-0281. Formally issued 3-17-05. Applied 6-14-05.
Remove dust cover: MI XD5-2-1060. Formally issued 1-3-06. Applied 5-22-06.**

MI ... Manufacturing instruction
S0X... 99~04M ODYSSEY

[3]QIS SHJA-070406-01

■ Cause

Assembly Contamination / NG Weld



■ C/M

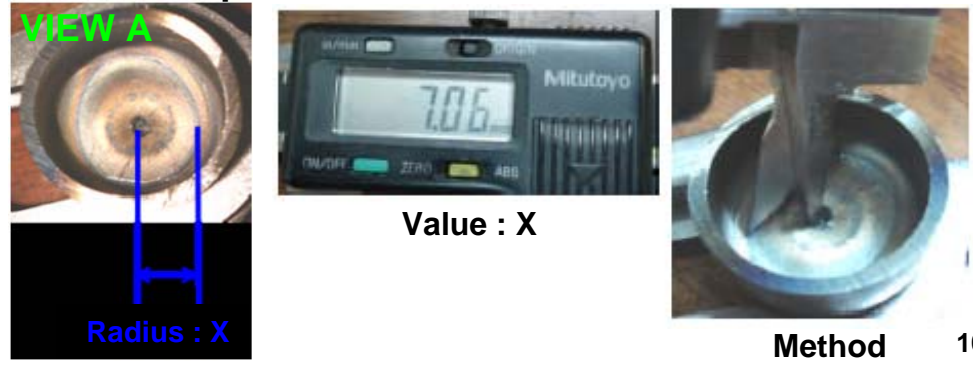
For contamination issues, a polycarbonate cover was made to cover the component parts bins to prevent airborne contaminants from getting into the bins.

For offset weld, the program was adjusted and a new inspection standard was set that includes an internal visual and measurement inspection to ensure that the weld is centered. (2pieces per hour)

[Part Shield Added]



[Internal inspection]

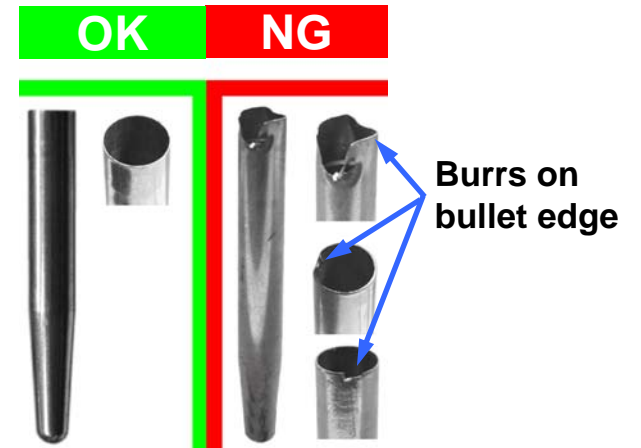


[4]QIS SHJA-071012-01 —①

■ Cause

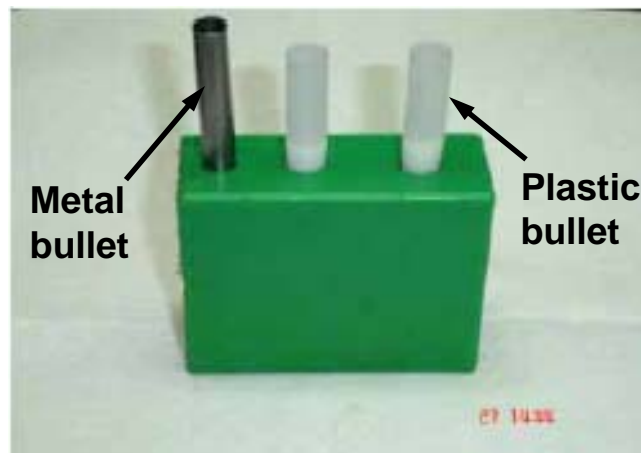
Burrs on Bullet edge causing seal damage

※Bullet is used to prevent seal damage when seal is set on the rod



■ C/M

Bullet material change (Metal ⇒ Plastic)

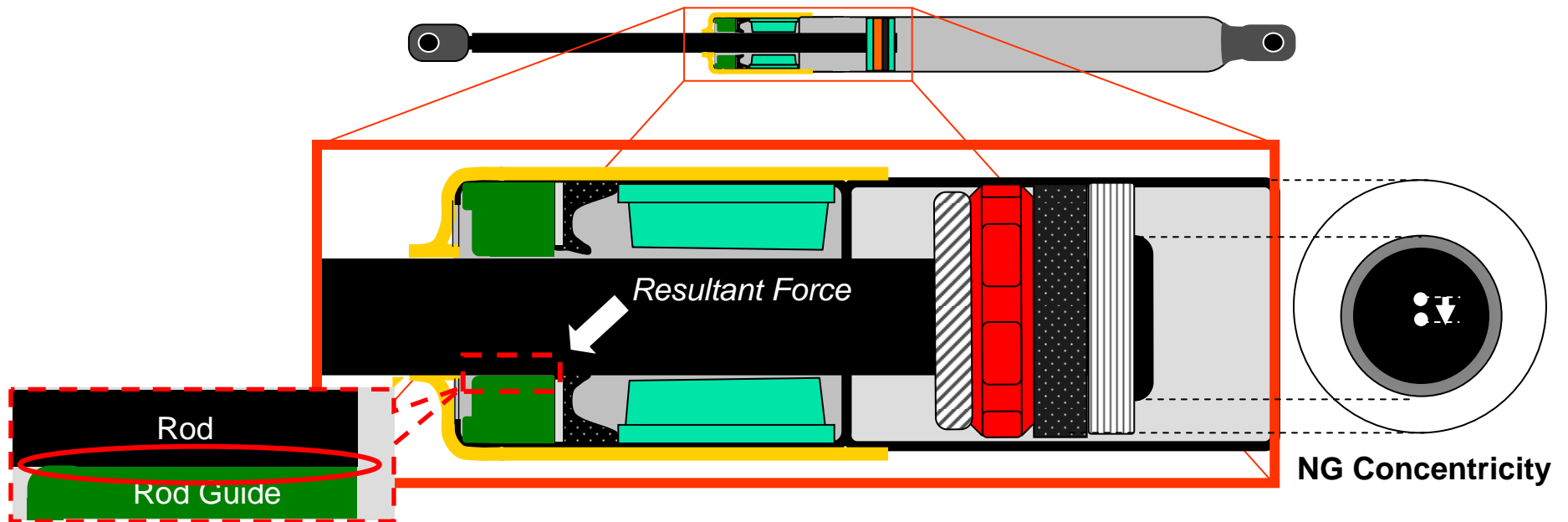


[4]QIS SHJA-071012-01 -②

■ Cause

Piston package concentricity out of spec for NG set up on reveter

NG Concentricity causes heavy rod guide to rod contact.



■ C/M

Revetting machine design change

① Rod guide design change (Push type ⇒ Clamp type)

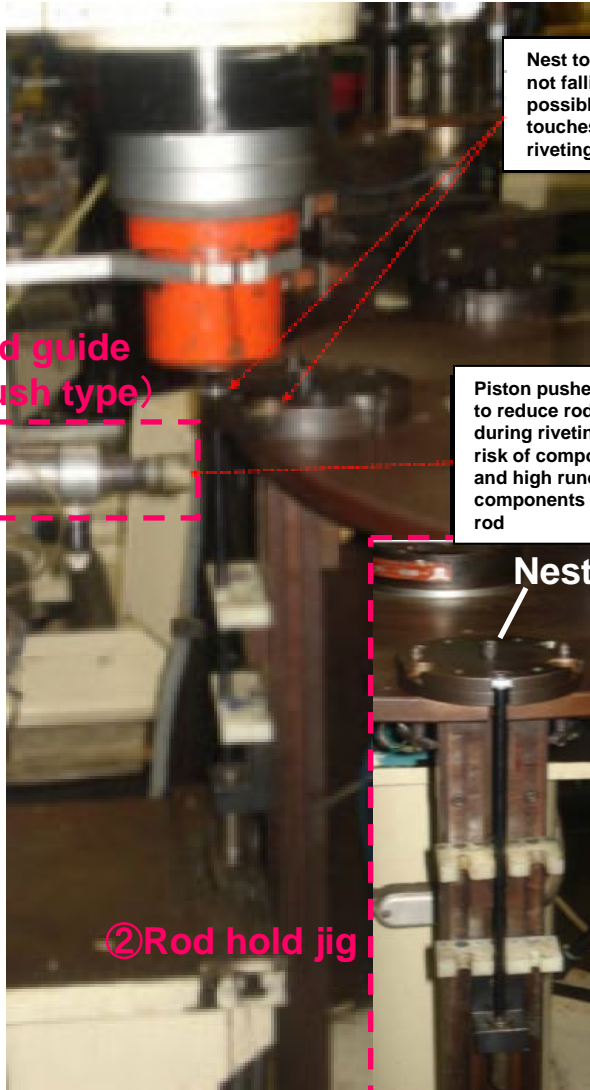
② Rod hold jig design change
(Hold components by nest ⇒ Hold rod by base)

[4] QIS SHJA-071012-01 — ②

■ Revetting machine

BEFORE

Orbital rod riveting system with nest to hold the components



Nest to hold the components not falling before riveting, possible damage if nest touches the components at riveting time

No nest required due to bases that holds the rod in place to avoid movements and components falling before riveting

Piston pushes rod to help to reduce rod movement during riveting, potential risk of component damage and high runout of components attached to rod

Chucks to hold the rod eliminate risk of damage to components when riveting and reduce the runout of components attached to the rod

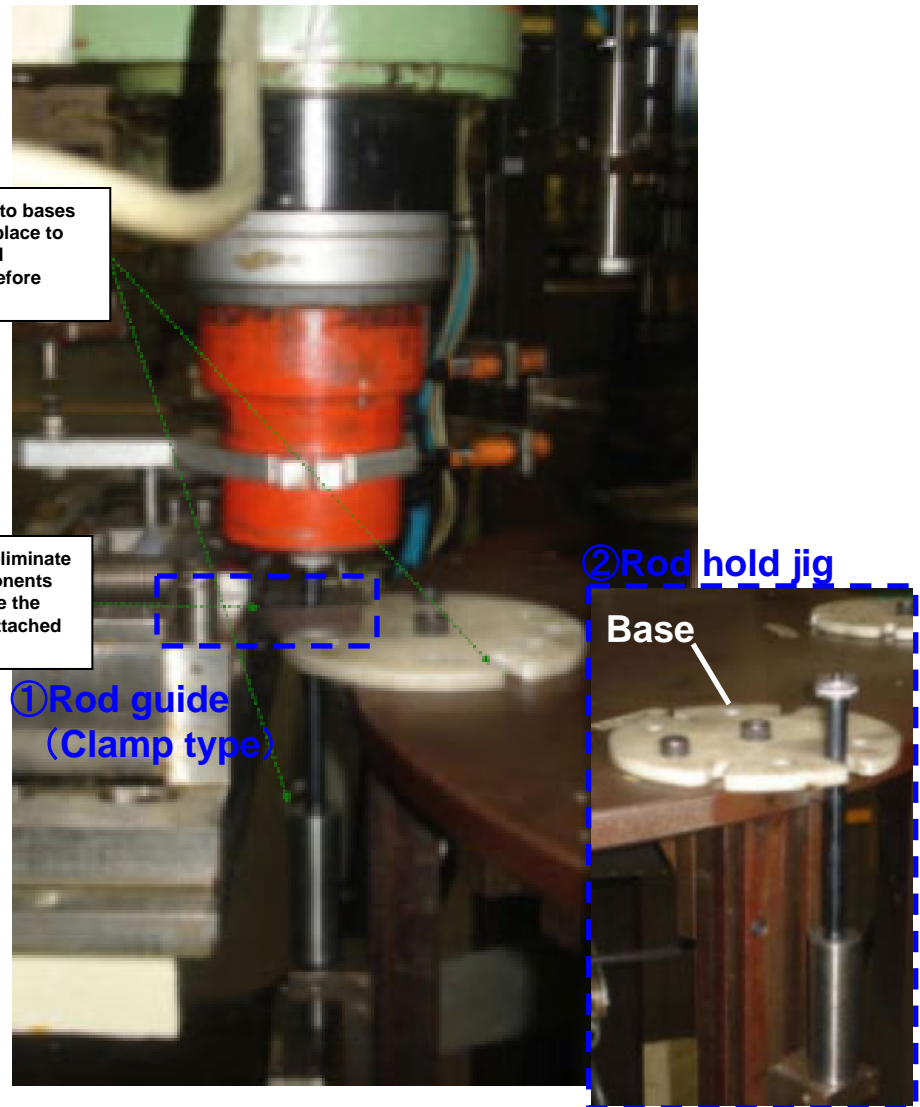
① Rod guide (Push type)

② Rod hold jig

Nest

AFTER

Orbital rod riveting system with colamps to avoid damage to the components



① Rod guide (Clamp type)

② Rod hold jig

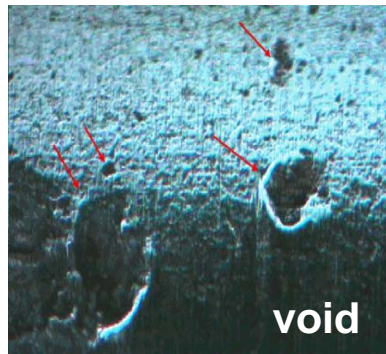
Base

[4]QIS SHJA-071012-01 —③、④

■ Cause

③Using rejected rod by eddy current tester

④Material defect in the rod (void and laps/seams)



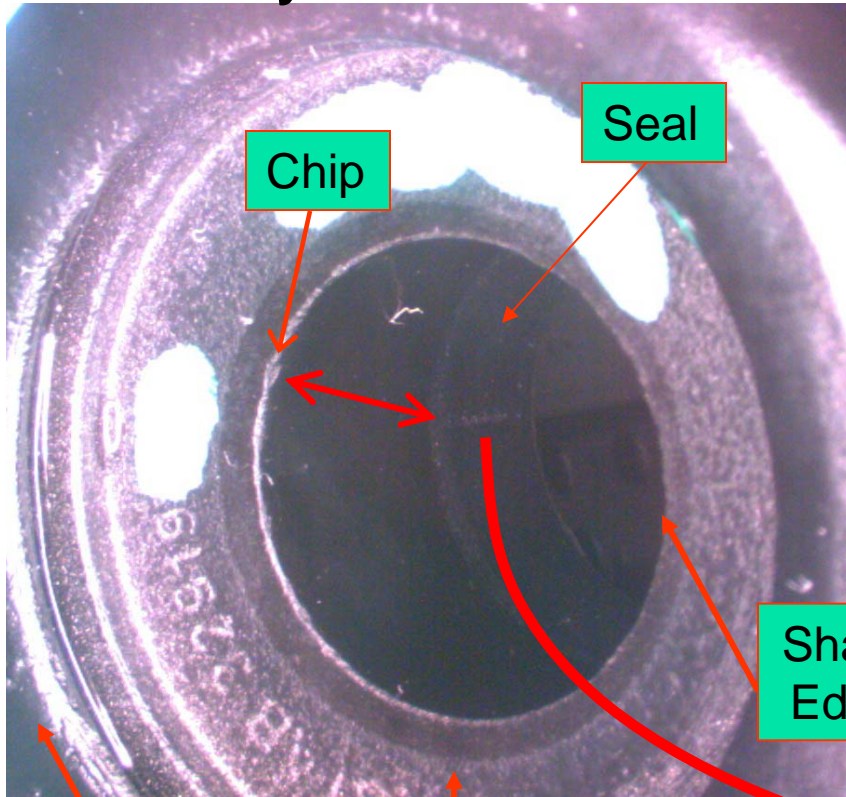
■ C/M

③-1. Reject parts go into the locked box

③-2. Eddy current adjustment more sensitive

④Raw material supplier change

Part Analysis Claim #254293

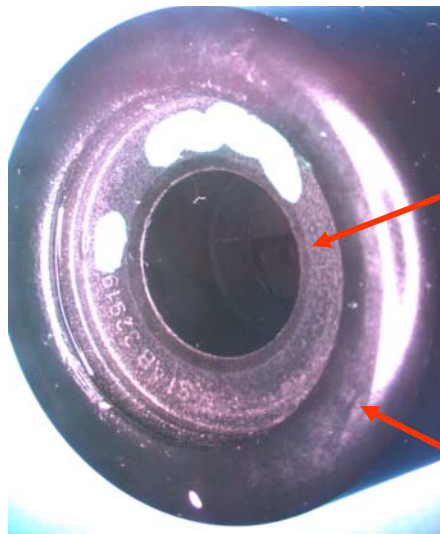


Rod Guide Material is hard and abrasive. Under a side load pieces may break off and damage seal and rod.



Tube

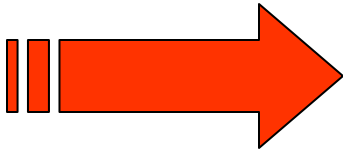
Rod Guide ★



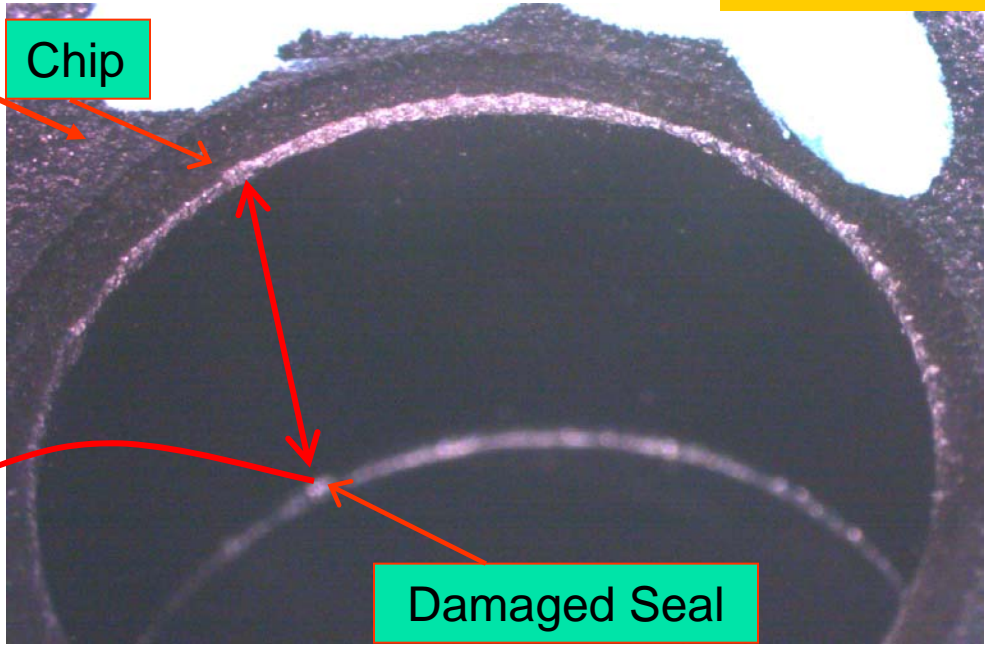
Precision

Inner Guide ★

Chip

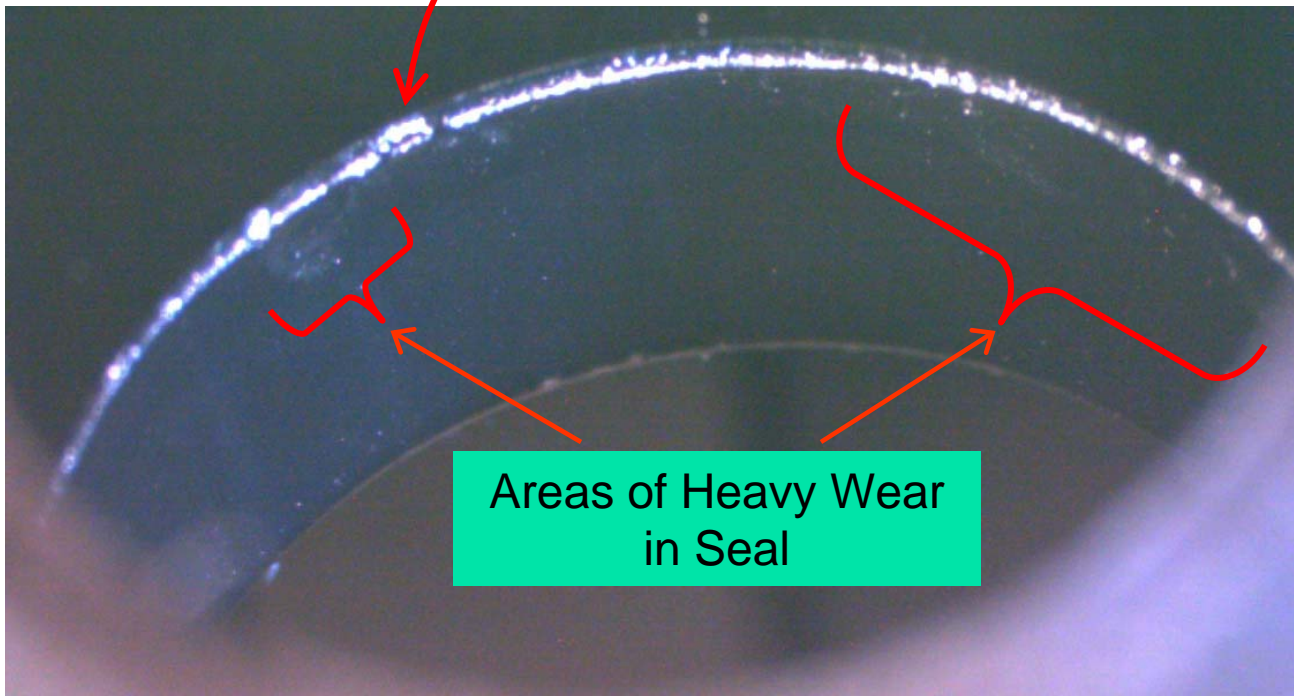


Tube



Damaged Seal

Claim #254293

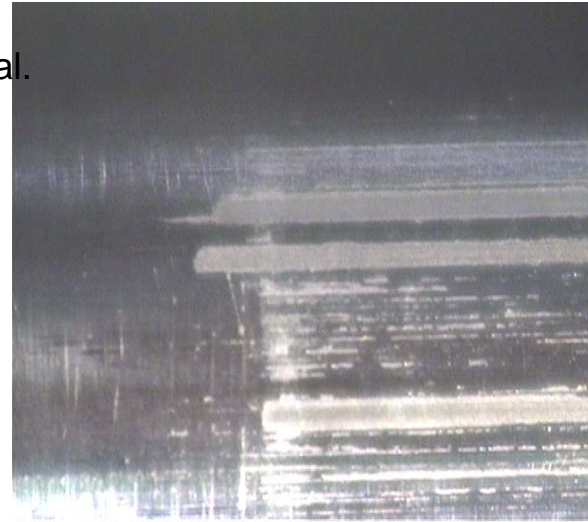
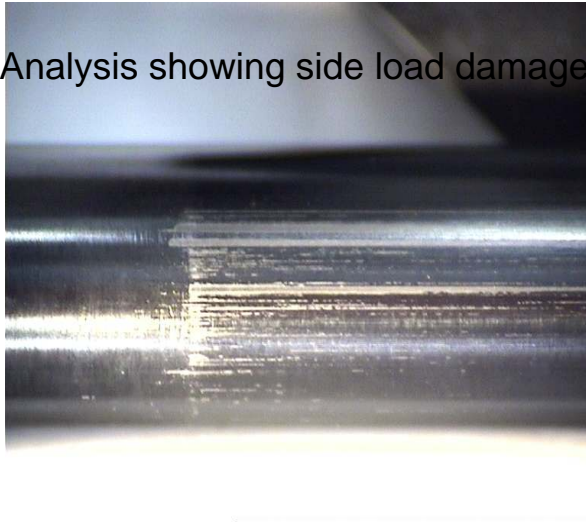


Areas of Heavy Wear in Seal

Return part analysis (HGT)

Scratches were found on 2 locations, rod and seal. The scratches show severe wear which is normally caused by high horizontal load or bend load. The rod scratches are caused by horizontal load when rod is possibly pushed against inner rod guide from one direction. This will cause inner lip damage shown on the pictures. HGT believes that conditions for installation etc. need to be confirmed.

HGT Analysis showing side load damage to rod and seal.

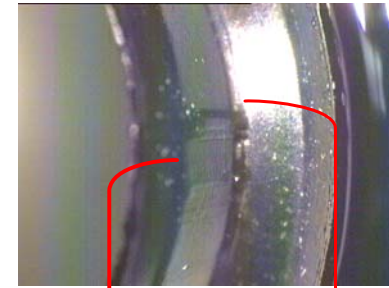
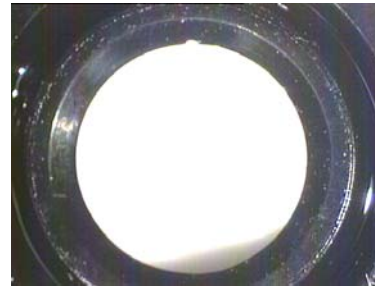


Recreation test (at Stabilus. DE and HGT)

Report submitted from Stabilus Germany on July 28.
Seal with one single defect (after 1000 cycle)

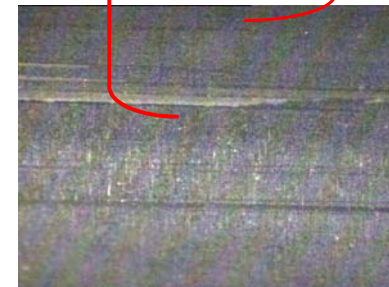
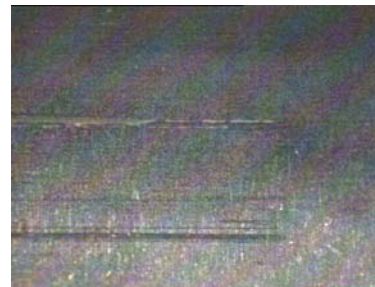
Stabilus Germany report 7

Recreation test using rod guide with no deburring



Root cause is scratch at rod

First scratch was found after 250 cycle.
Gas/oil loss was found after 1000 cycle and gas pressure went down to 53%.
Scratch depth was 0.4 μ m and width was 0.1mm at max.



Mass test show a depth of approx.4 μ m at the scratch area, scratch width up to 0,1 mm

Scratches were noticeable at the first visual check after 250 cycle, no force or oil loss at this time.

First gas and oil loss (remaining gas spring pressure at 53%) after 1000 cycle. Seal picture above shows

seal condition at that time.

Chipping is cause of damage.

Cause is the burr on edge of outer guide on the 8mm OD rod.
Tiny part of burr comes off during stroke and slips in between guide and lot causing scratches on rod.

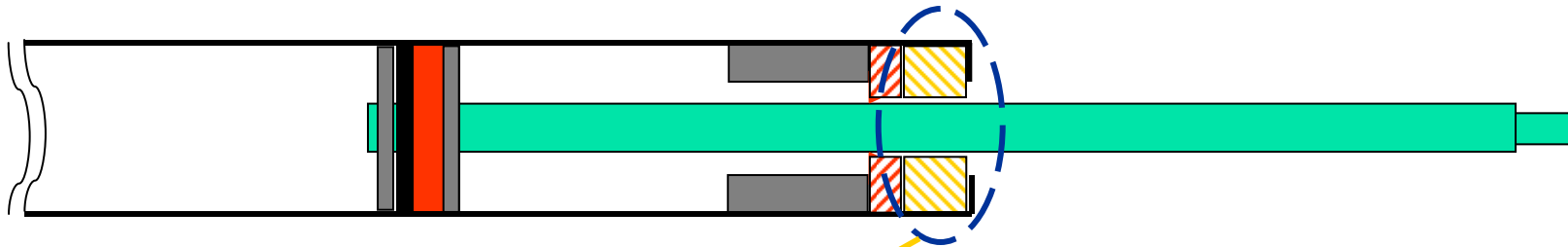
correct de-burred. The edge condition shows some amount of remaining

and slip into the gap between guide

parts.

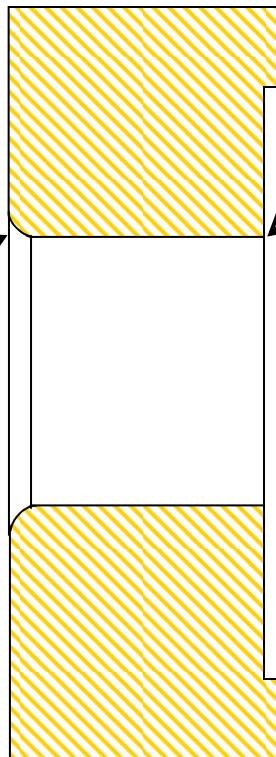
SHJ Open Stay Failure Diagram

Back data



C/M

0.3mm
Radius



Improve De-burring Process
and inspection method to
vision system 100%
Jan/05

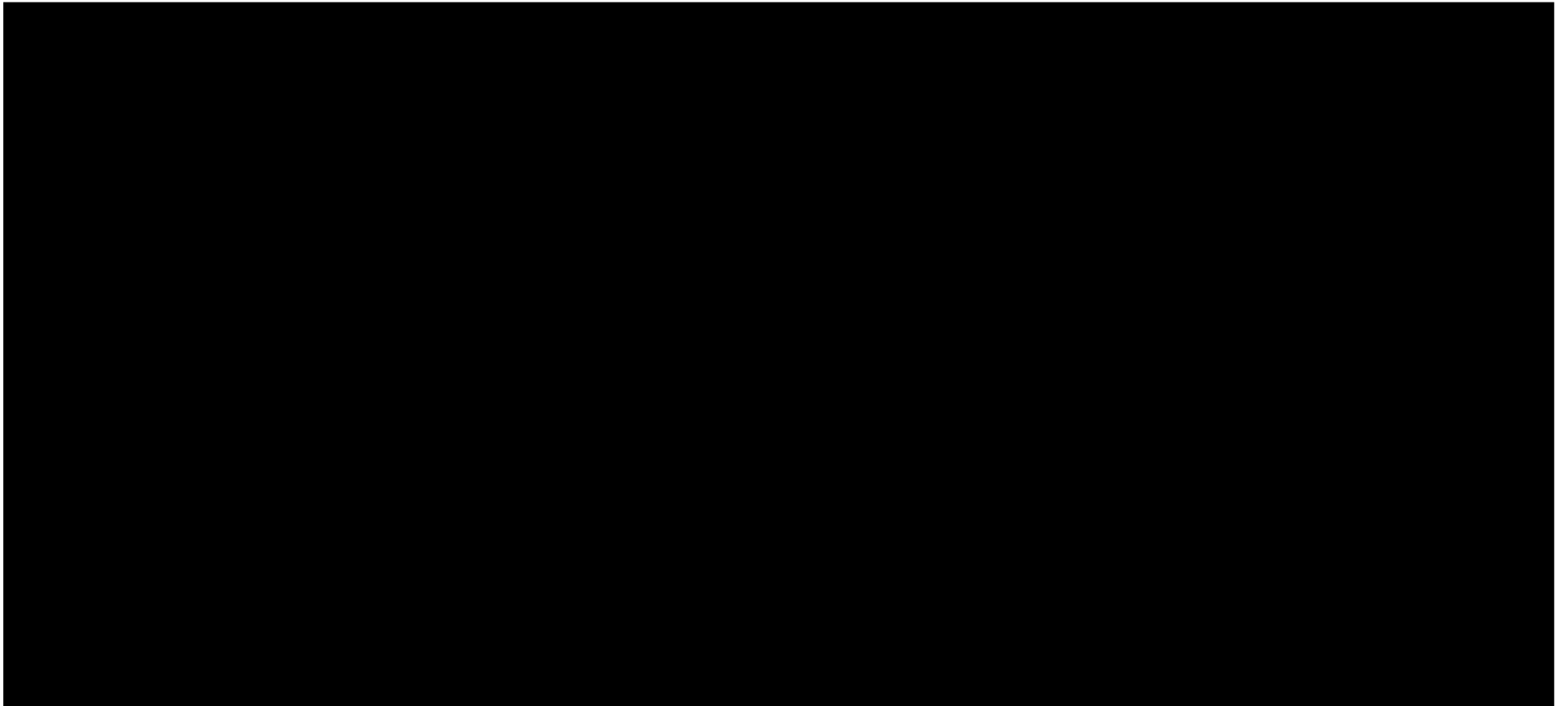
- **Process change**
Deburring time change (3 times more)
- **Control method change**
Frequency change: Sampling to 100%
Method change: Visual to auto
- **Die maintenance**
Improve fit on the parting area

Attachment #11

Original Language (Japanese)

Honda Response to #Q11

EA08-015 - Japanese

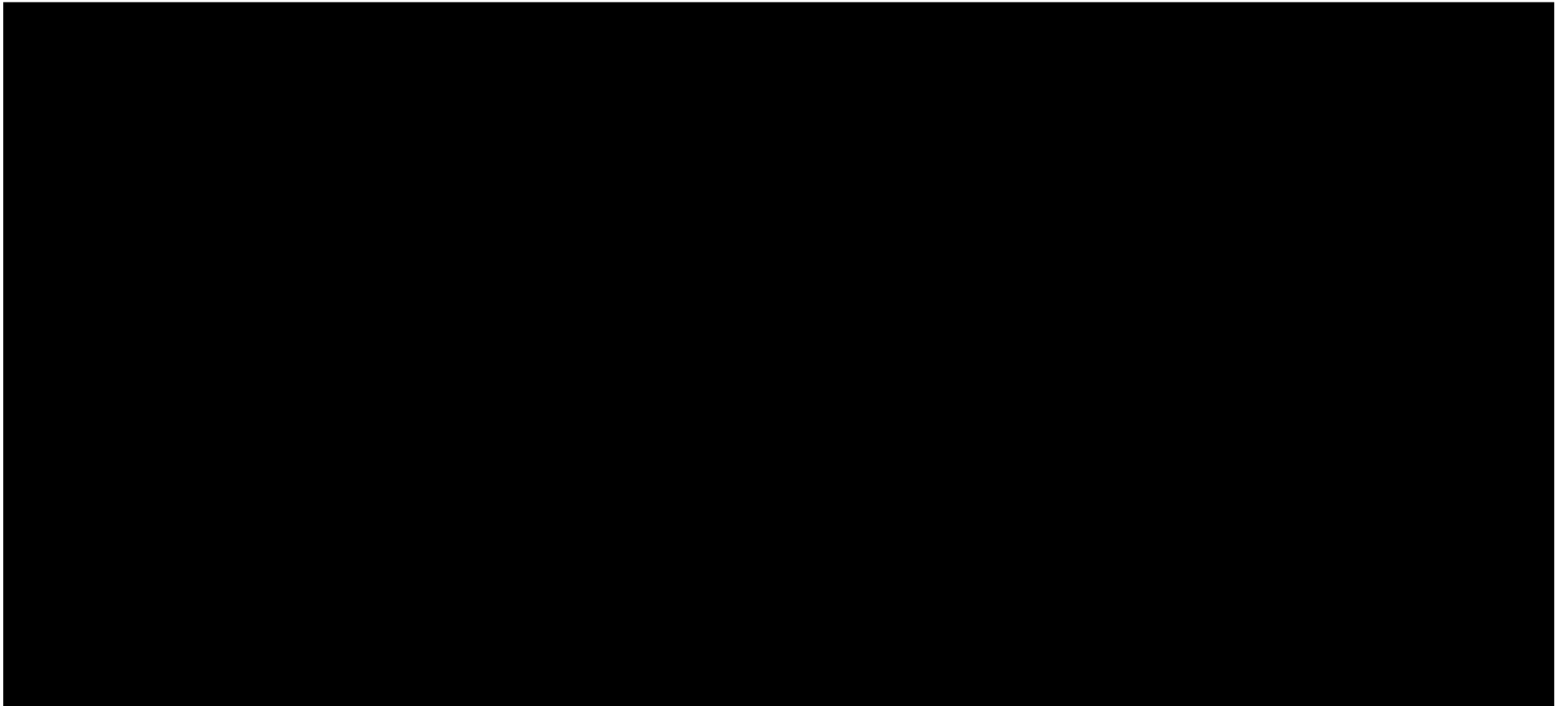


Attachment #11

English Translation

Honda Response to #Q11

EA08-015 - English

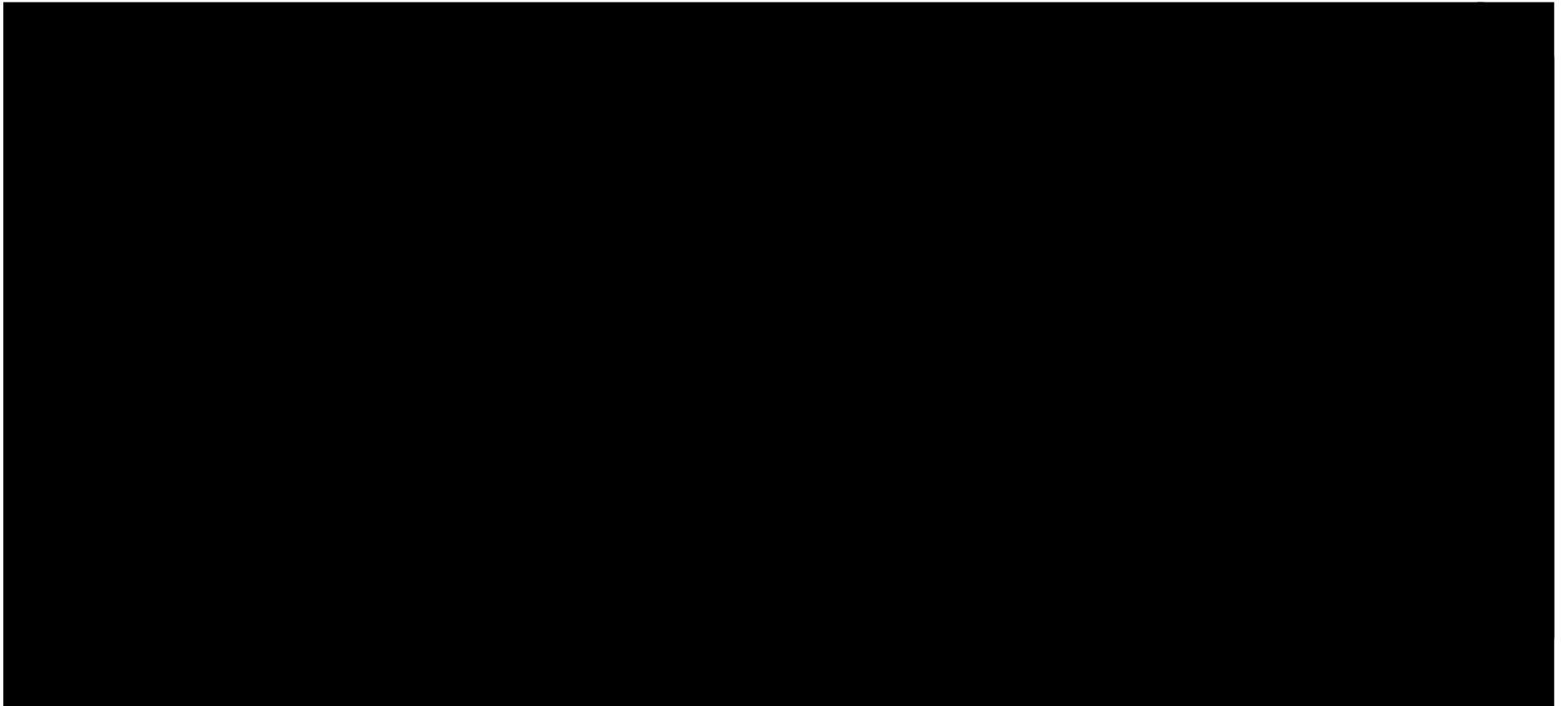


Attachment #12

Original Document (Japanese)

Honda Response to #Q12

EA08-015 - Japanese

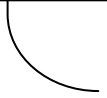
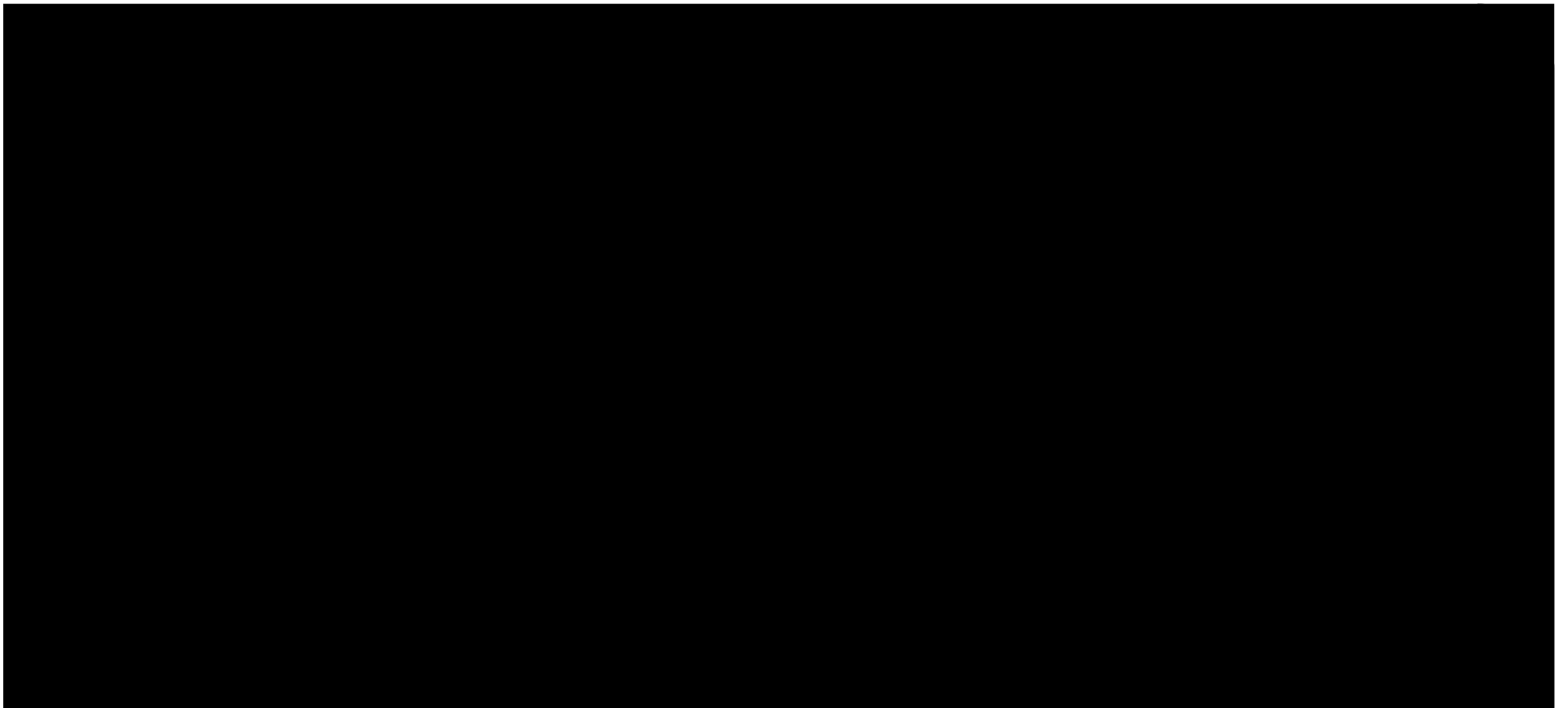


Attachment #12

English Translation

Honda Response to #Q12

EA08-015

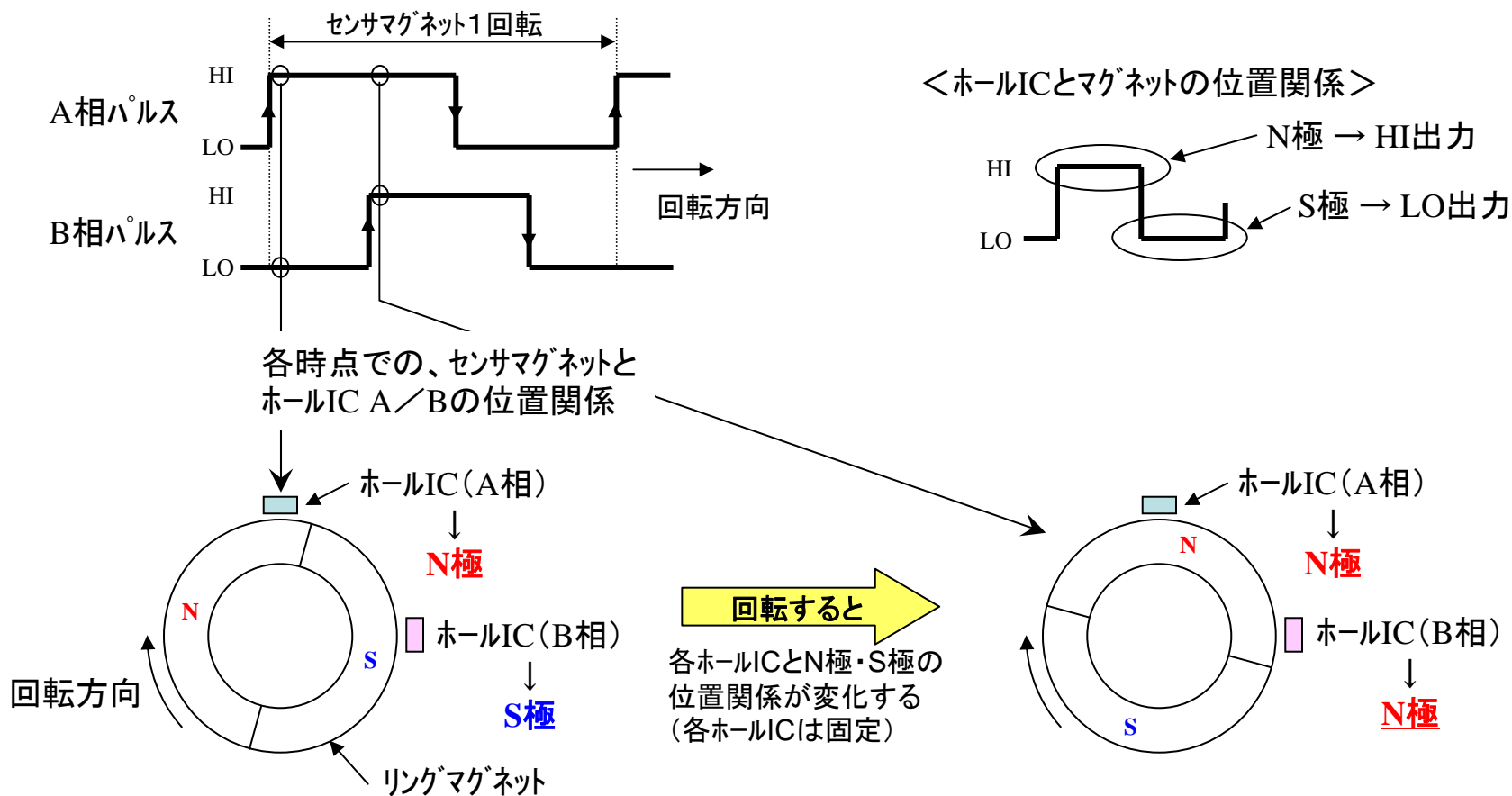


Attachment #13

Original Document (Japanese)

◆ どうやって、T/Gの速度を検出しているのか？

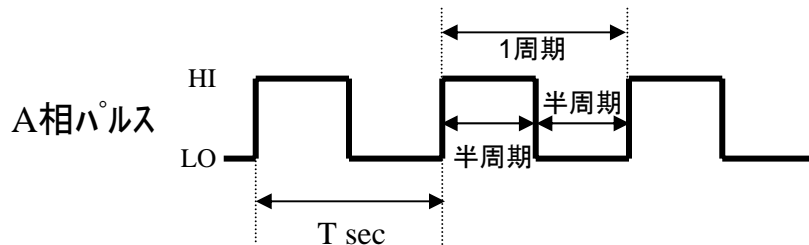
ECUは、ドライブユニットに内蔵されているパルスセンサから速度を演算して検出している。
 ここで、パルスセンサとは、T/Gの開閉動作(手動・電動共に)と連動して回転する(CW方向、CCW方向)リングマグネットがドライブユニット内に搭載されており、その回転(マグネット(N極・S極)の回転)に応じて、磁力を検出し、電圧に変換するホールICによって検出している。



◆ どうやって、T/Gの速度を検出しているのか？

T/G速度検知

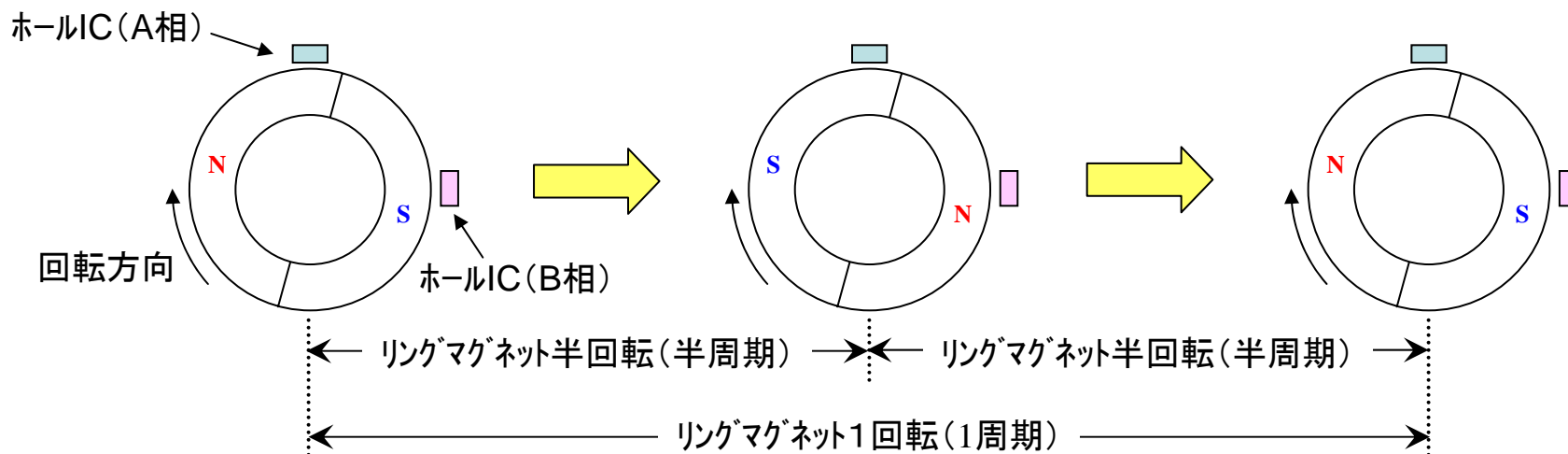
パルス周期を測定することにより、作動速度を算出する



A相パルスの1周期(センサマグネット1回転)に要した時間(T)を測定することで、速度V(mm/sec)がわかる。
(速度 = 距離 ÷ 時間)

$$V = \frac{X}{T} \text{ (mm/sec)}$$

ここで、Xはリングマグネット1回転でT/GATEが動く量であり、
設計DATAより設定出来る固定値である。



※上記例は1周期による速度演算であるが、半周期毎に演算も可能

PTGが採用している挟み込み検知の手法は下記の3つ(大きく分類すると2つ)

- (1) 間接検知方式 { ①絶対値検知方式(パルス幅検知)
②電流検知方式
- (2) 直接検知方式 → ③ピンチセンサによる検知方式

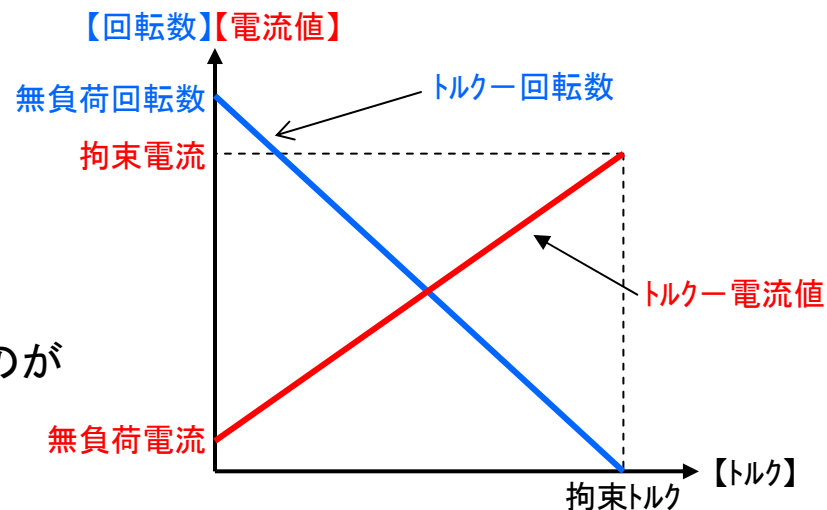
1. 間接検知方式

間接検知方式は、挟まれたことを検知するのではなく、モータの情報から「挟まれただろう」と推測する検知方式である。

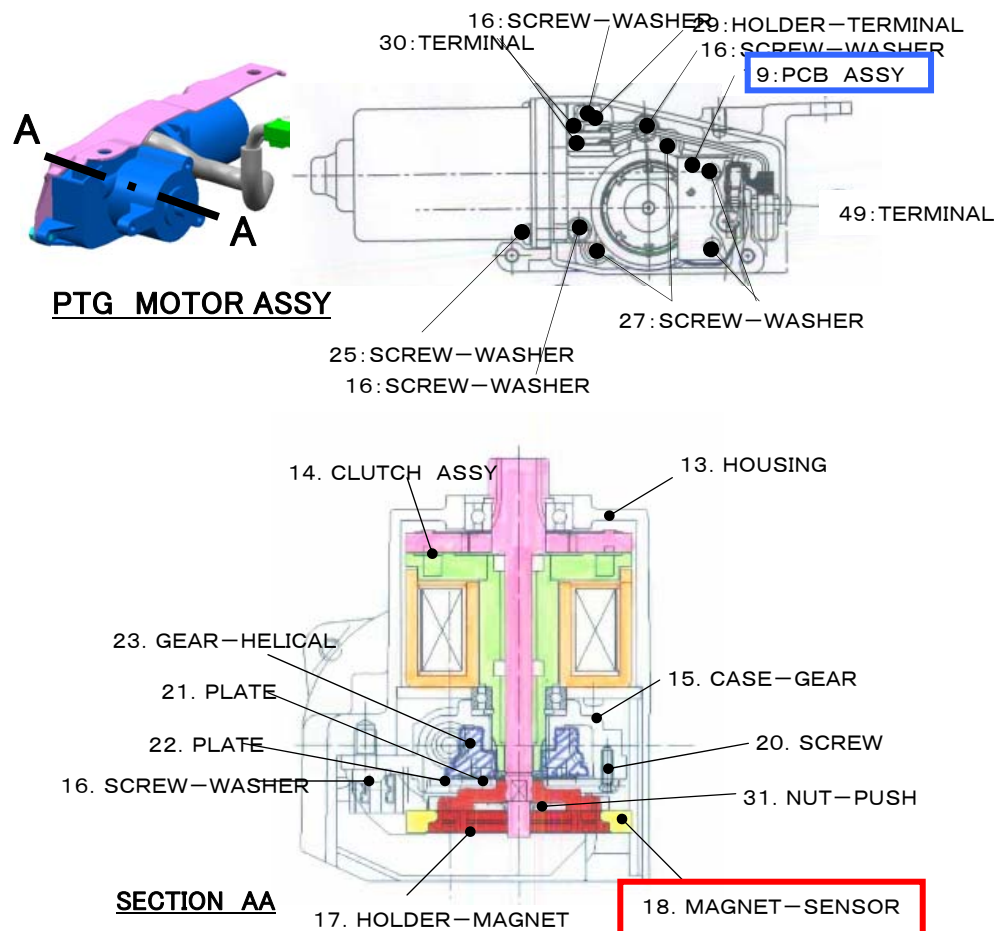
モータには右図のような特性がある。
(トルク-回転数、トルク-電流)

この中でECUが検出可能な物は
電流値と回転数(パルスセンサより)である。

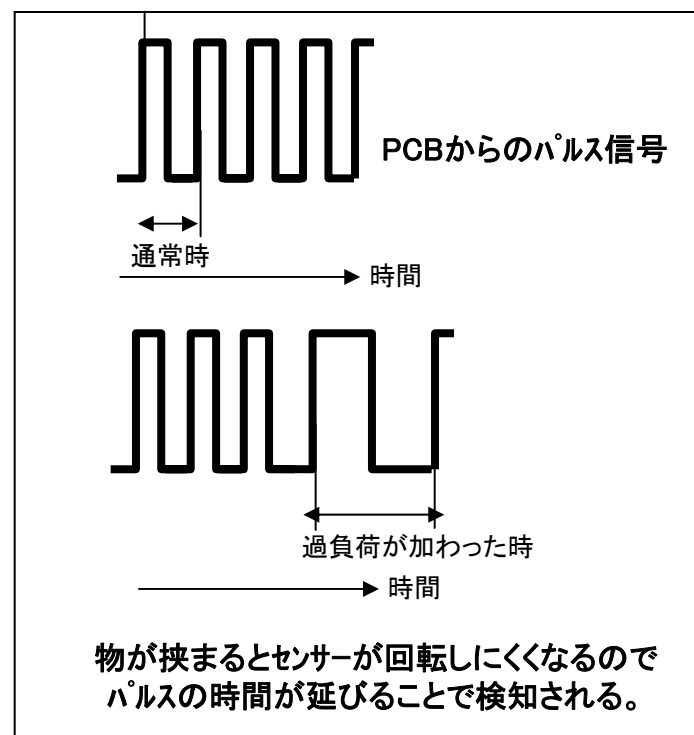
この電流値と回転数を用いて検知しているのが
上記①、②である。



間接検知(絶対値検知)について



マグネットセンサーには磁石がついていてN極、S極があります。それをPCB ASSYで検出すると下のような波形が出てきます。



電流検知とは

◇電流値で挟み込みが検知出来る理屈は下記の通り

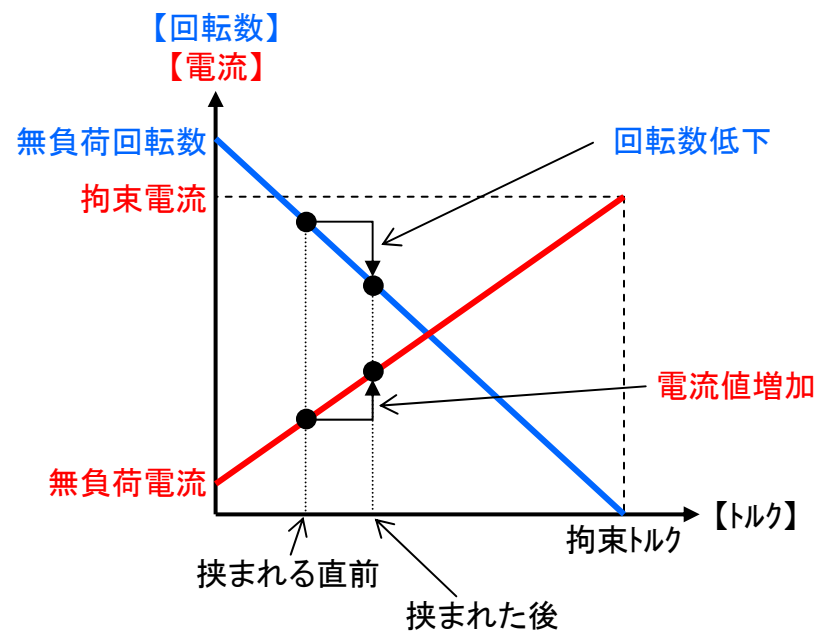
作動中に人や物が挟まれると、回転数が落ち
モータ負荷(トルク)が高くなる



トルクが高くなると電流値が上がる



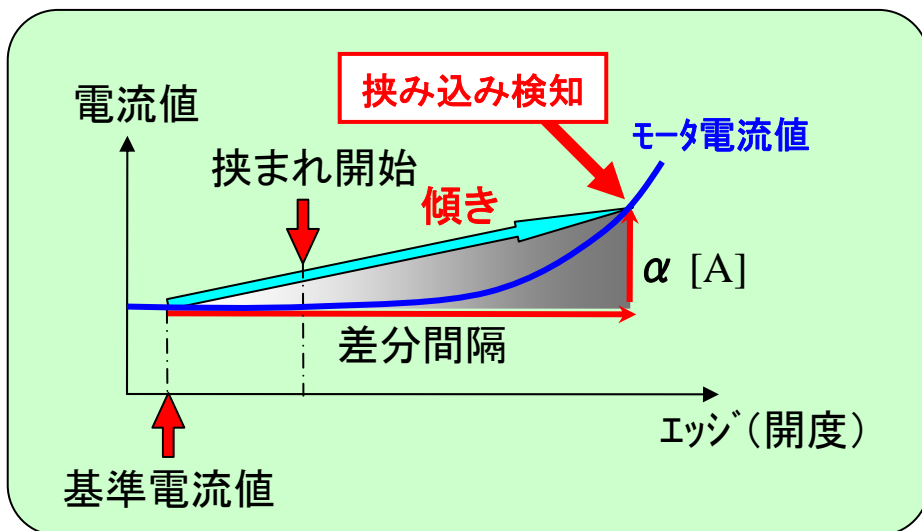
電流値の増加量が閾値を越えれば
反転命令(挟み込みと確定)



・電流検知閾値とは？

電流検知閾値とは、“どれくらい電流値が上昇したら挟み込みと推測させるか”を決定する値である。

閾値は、下図の通り、基準となるXエッジ前(差分間隔)の電流値に α [A]加算した値としている。



一定開度で α [A]増加で挟み込みと認識

電流増加の傾きを表す為
微分検知方式とも言う

閾値算出式(概略)

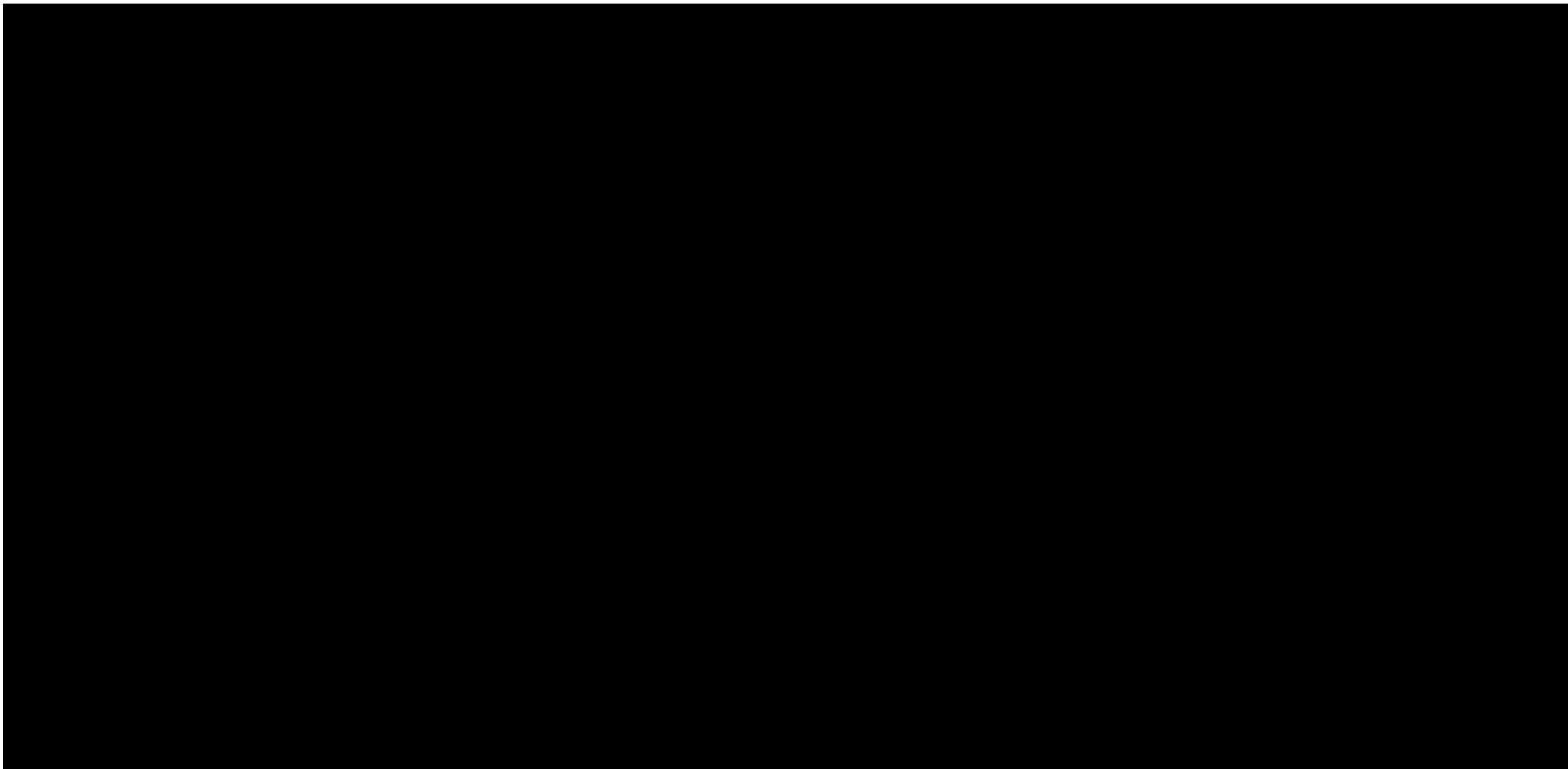
$$\text{閾値} = \text{基準電流値} + \alpha$$

基準電流値: 現在に対し、Xエッジ前(差分間隔)の電流値
 α : 挟み込みと判定する電流増加量(微分値)

SHJA QC PTG 実車挟み込み検知荷重試験結果

試験条件

- | | |
|-------------|----------------------------------------------|
| 1. 試験対象車 | SHJA QC317号車 |
| 2. 試験電圧 | :12V (バッテリー端子) |
| 3. ECU | :"EEPROM 設定表_294H_040525_閉作動_案1.xls"に準ずる ←量産 |
| 4. O/Stay仕様 | マニュアルT/G車(231号車)実車品 閉め始め7.4kgf) |
| 5. D/U | :VC bt品 (モータ特性CTR) |



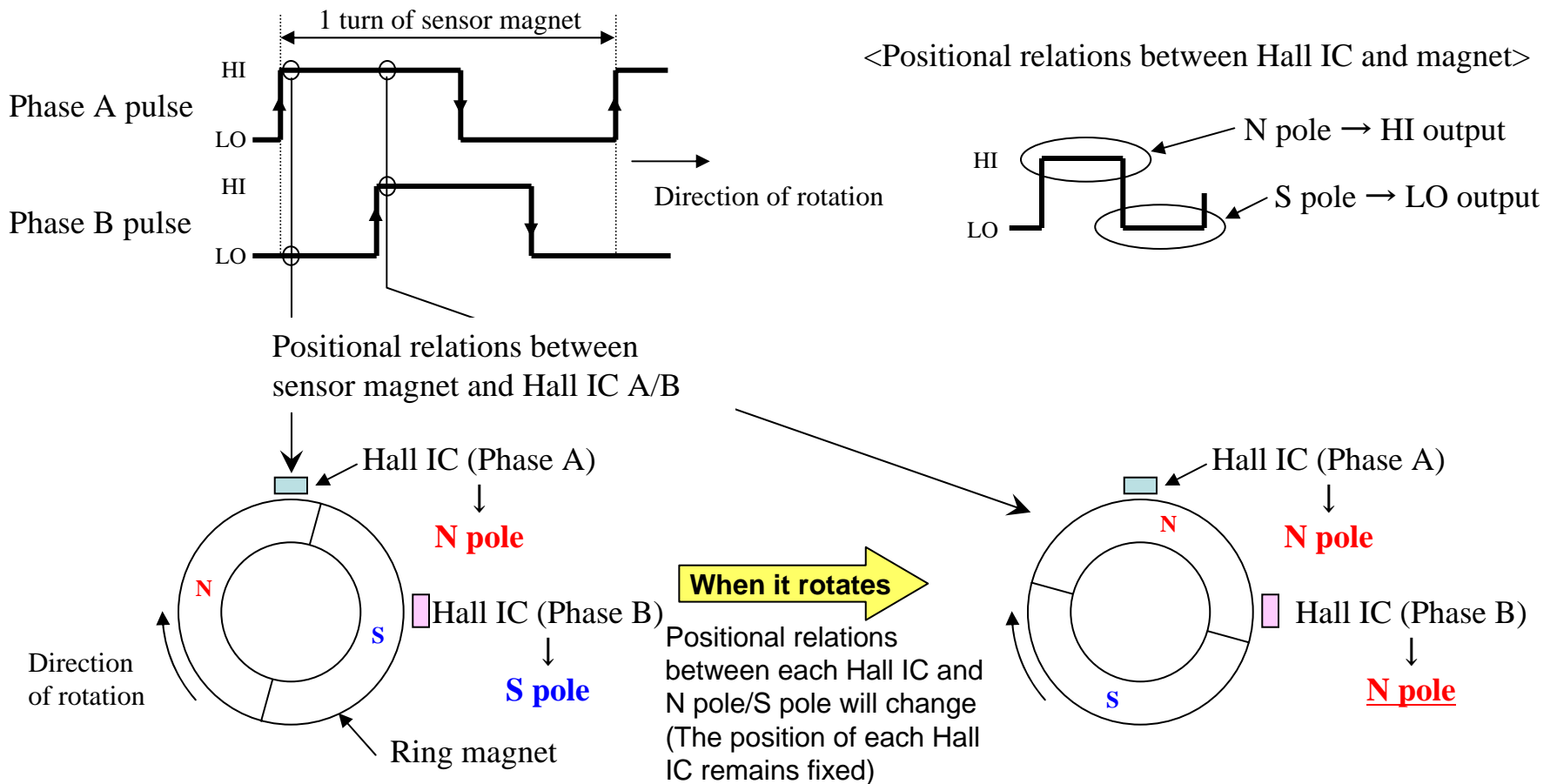
Attachment #13

English Translation

◆ How is the tailgate speed detected?

The ECU detects the speed by computing it from the pulse cycles of the pulse sensor contained in the drive unit.

The pulse sensor is a ring magnet contained in the drive unit, which rotates (clockwise or counterclockwise) as interlocked with the (manual/power) tailgate opening/closing motion. Depending on its rotation (rotation of the magnet's N and S poles), the magnetic force is detected and converted into voltage by the Hall IC.

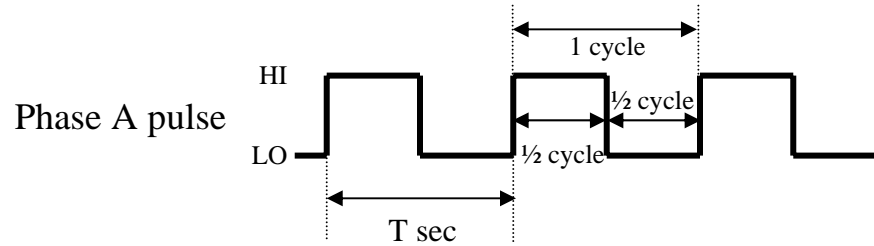


CONFIDENTIAL BUSINESS INFORMATION

◆ How is the tailgate speed detected?

Tailgate speed detection

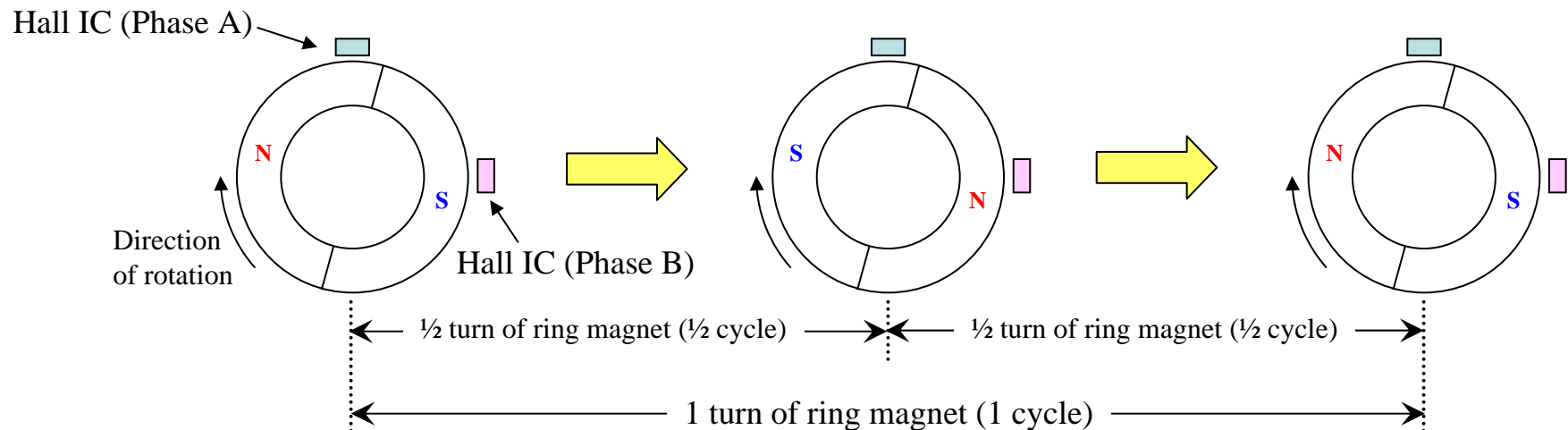
Pulse cycles are measures from which operating speed is computed.



By measuring the time (T) required for 1 cycle of phase A pulse (1 turn of sensor magnet), the speed V (mm/sec) can be computed. **(Speed = Distance / Time)**

$$V = \frac{X}{T} \text{ (mm/sec)}$$

Where, X is the amount of tailgate movement during 1 turn of ring magnet, which is a fixed value determined by design data.



※According to the above example, 1-cycle speed is computed, but 1/2-cycle speed may be computed as well.

The power tailgate employs the following three pinch detection methods (that can be broadly classified into two groups):

- (1) Indirect detection method {
 - ① Absolute value (pulse width) detection method
 - ② Current detection method
- (2) Direct detection method → ③ Pinch sensor-aided detection method

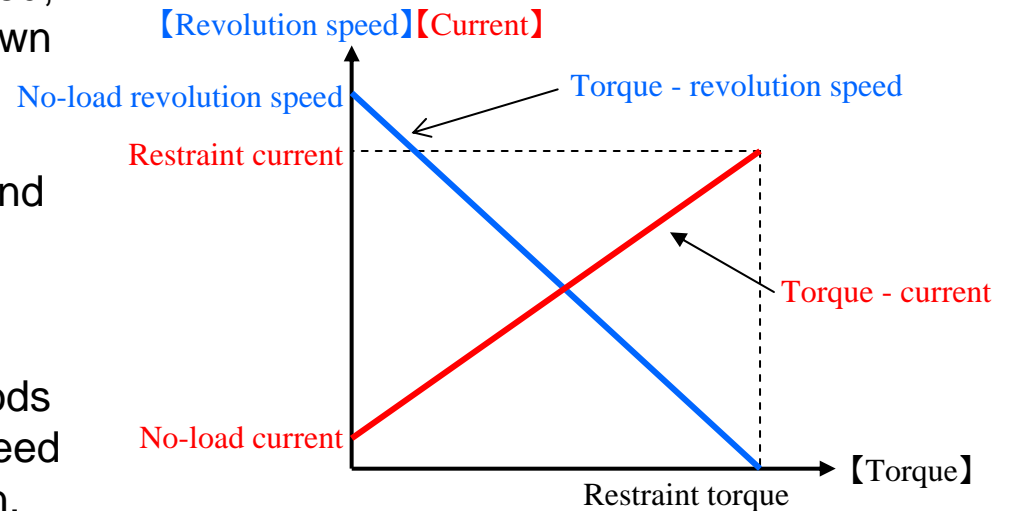
1. Indirect detection method

The indirect detection method is not a method to detect the occurrence of pinch, but is a method to conjecture the “possibility of pinch” from the motor information.

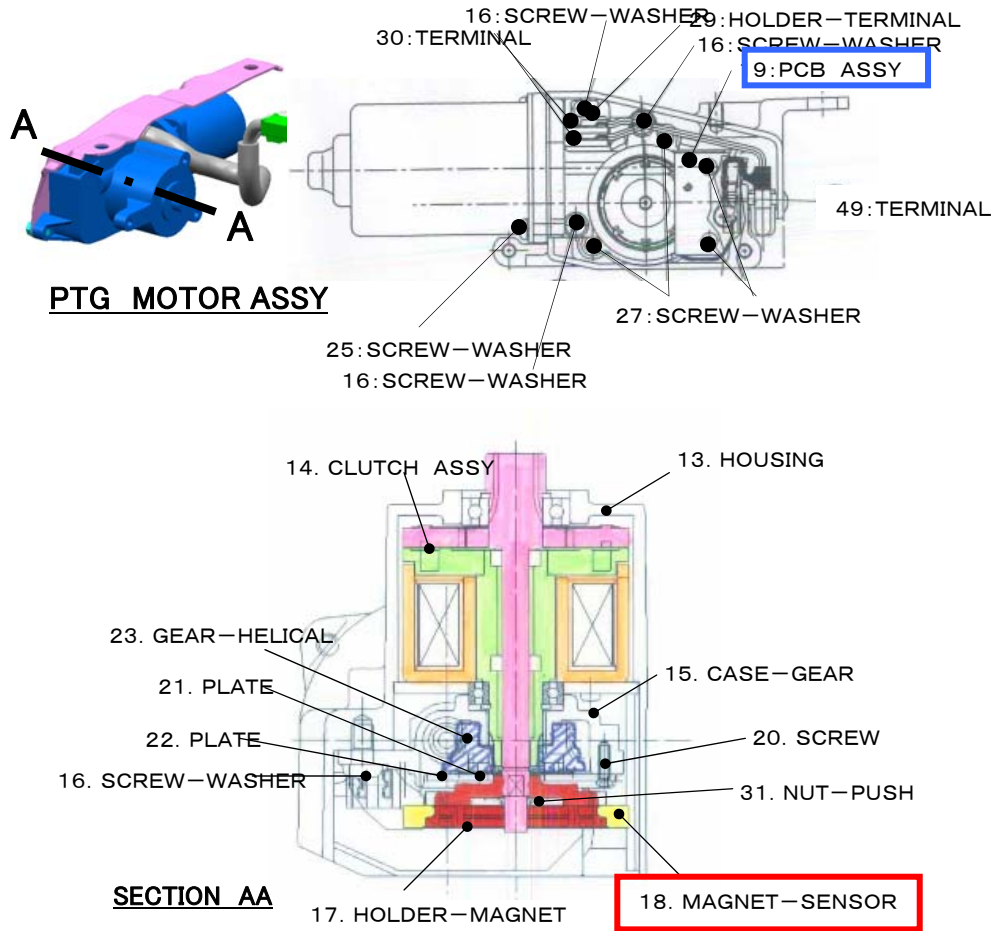
The motor has (torque - revolution speed, torque - current) characteristics as shown in the figure on the right.

Among these characteristics, current and revolution speed are detectable by the ECU (pulse sensor).

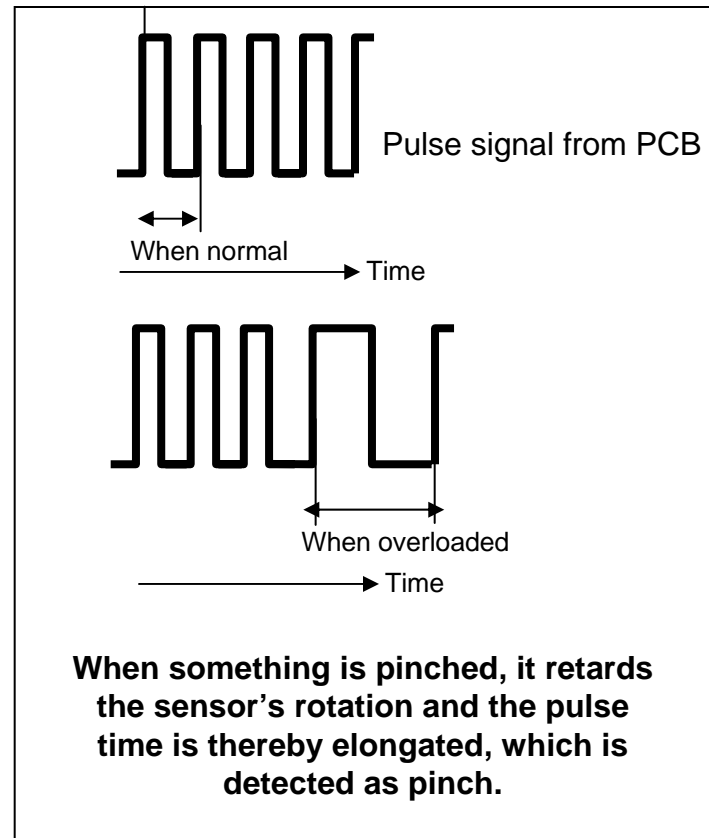
The above-mentioned ① and ② methods employ such current and revolution speed as detected by ECU for pinch detection.



Indirect (absolute value) detection



The magnet sensor is fitted with a magnet that has the N and S poles. Detection thereof by the PCB ASSY results in the following waveform:



Current detection

- ◇ The following explains the theory about why pinch can be detected according to current value:

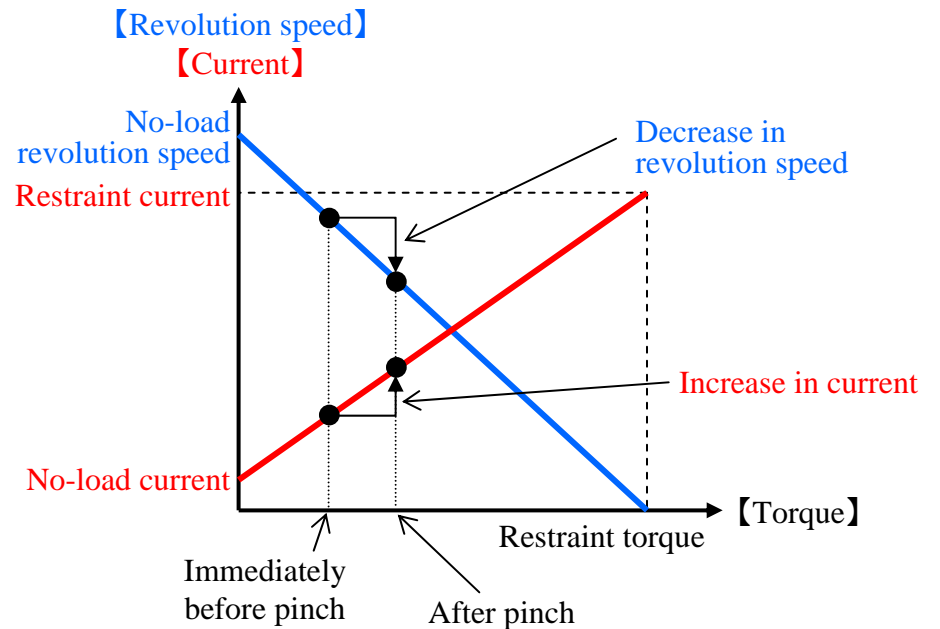
If somebody or something is pinched during operation, the revolution speed decreases and the motor load (torque) increases.



The current increases as the torque increases.



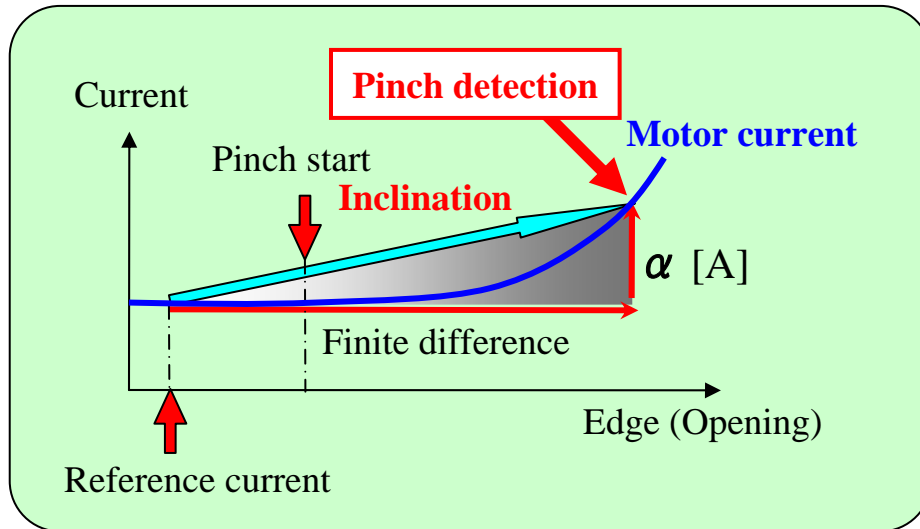
When the increase in current exceeds the threshold, it is determined to be a pinch and a reversal command is given.



▪ **Definition of current detection threshold**

Current detection threshold is a value to determine “how much increase in current should be conjectured as pinch.”

The threshold is, as shown in the following figure, defined as a value of the reference current i.e. the current before X count of edge (finite difference) plus α [A].



In the event of current increase by α [A] at a constant degree of opening, it is recognized as pinch



Because the inclination of current increase is indicated, current detection method is also called “**differential detection method**”

Threshold calculation formula (simplistic formula)

$$\text{Threshold} = \text{Reference current} + \alpha$$

Where:

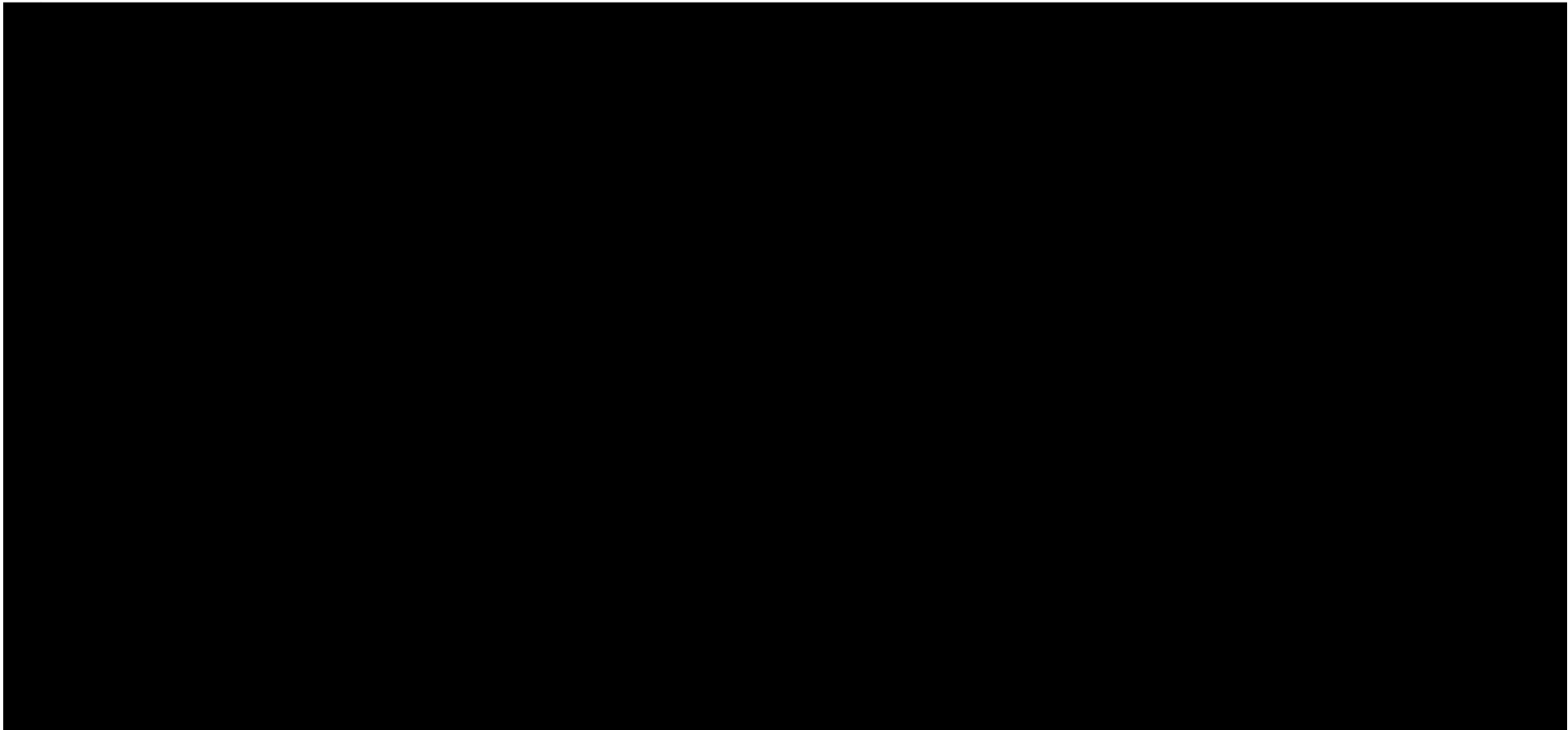
Reference current is the current before X count of edge (finite difference),

α is the current increase (differential) determining pinch.

SHJA QC Power Tailgate Pinch Detection Load Test Results

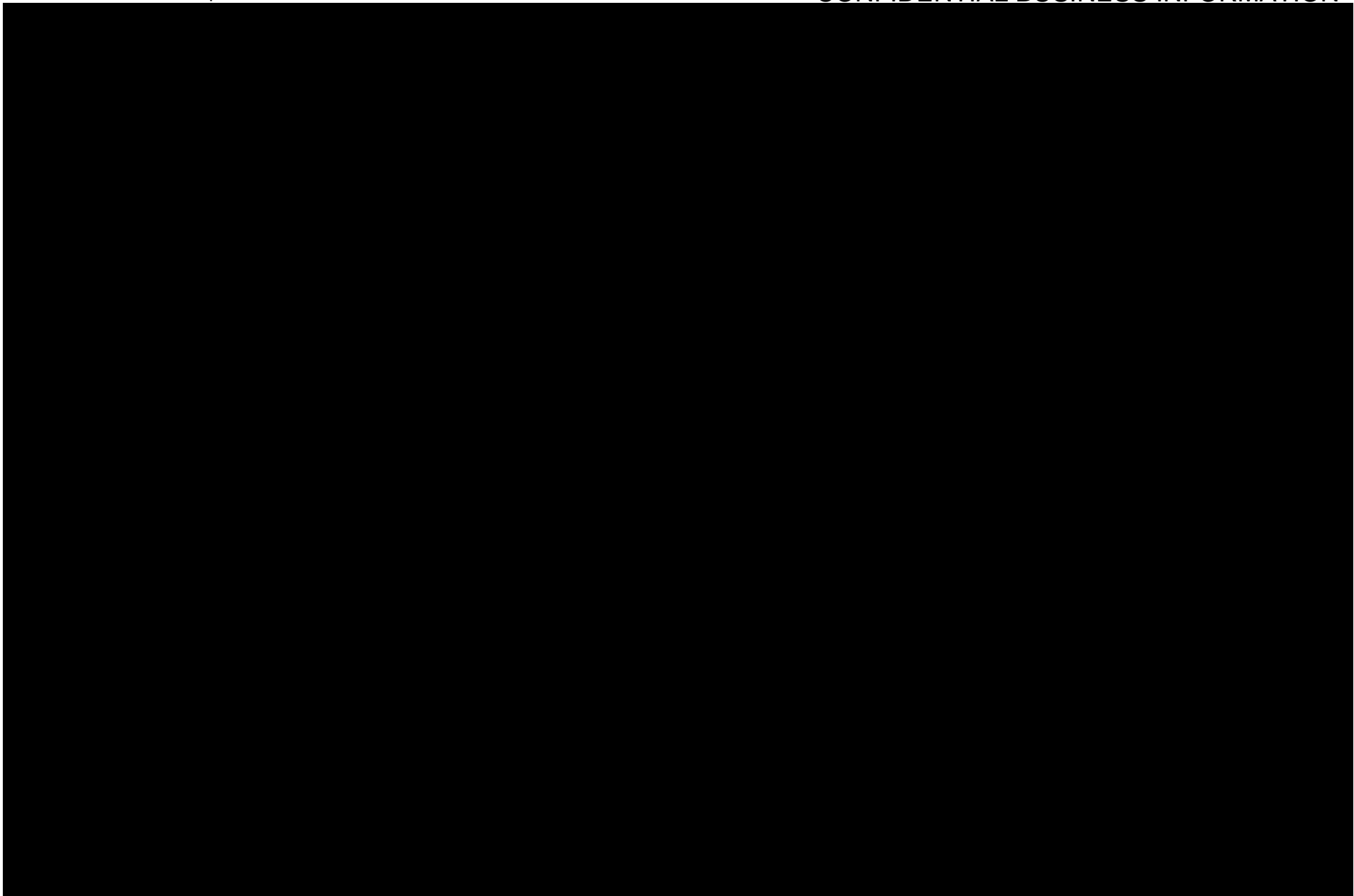
• Test conditions

1. Test vehicle : SHJA QC No.317 vehicle
2. Test voltage : 12V (at battery terminal)
3. ECU : As per "EEPROM Setting List_294H_040525_Closing Operation_Plan.1.xls" ← Mass-produced one
4. Open stay spec : The one installed in vehicle (No.231) fitted with manual tailgate (Initial closing load 7.4kgf)
5. Drive unit : VC lot (motor characteristics control)



Attachment #14

Original Document (Japanese)

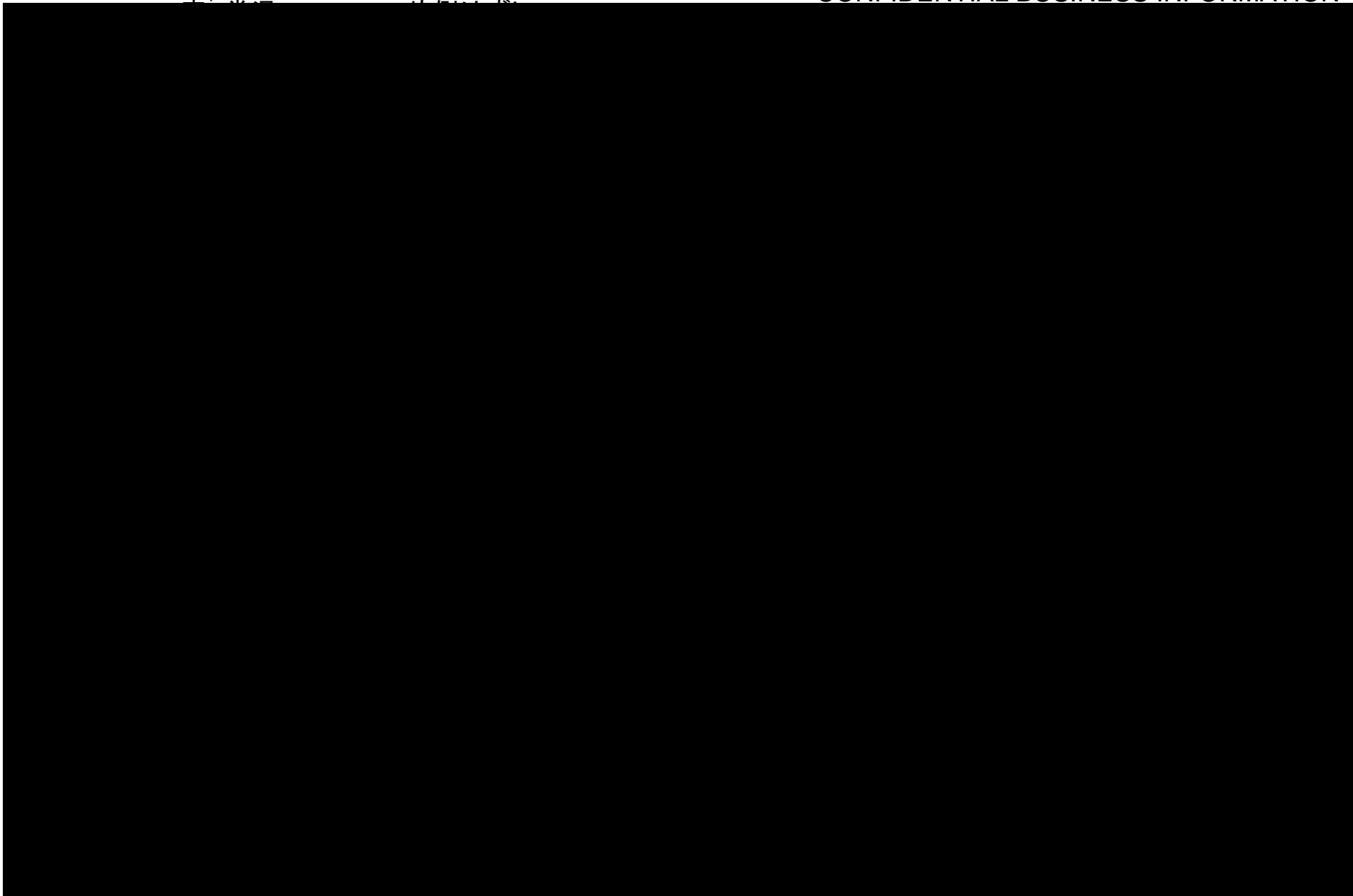


【検証方法】

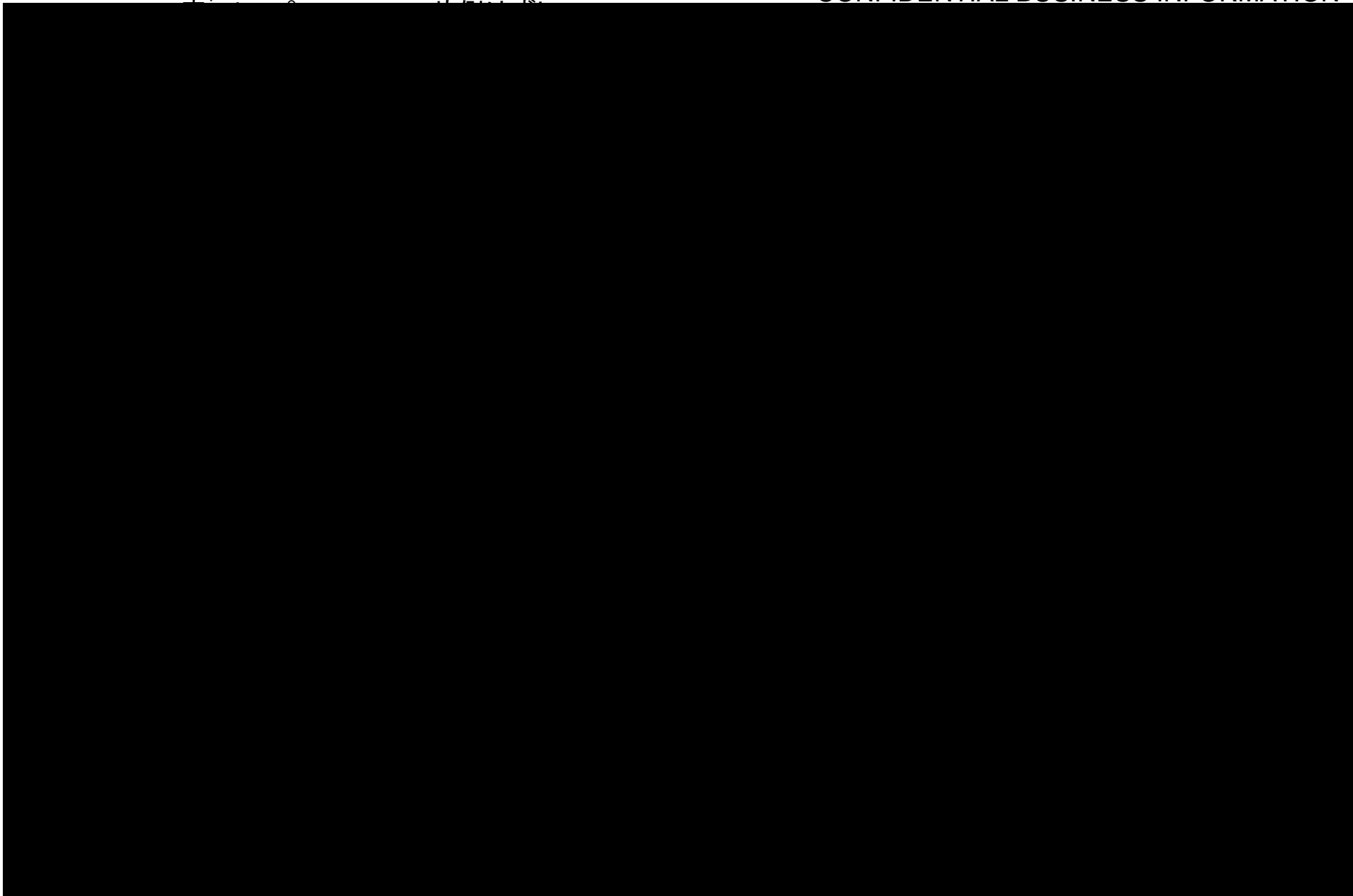
テールゲートが必ず落下検知動作に入るように
O／STAYを1本はずして検証している。

【測定結果】

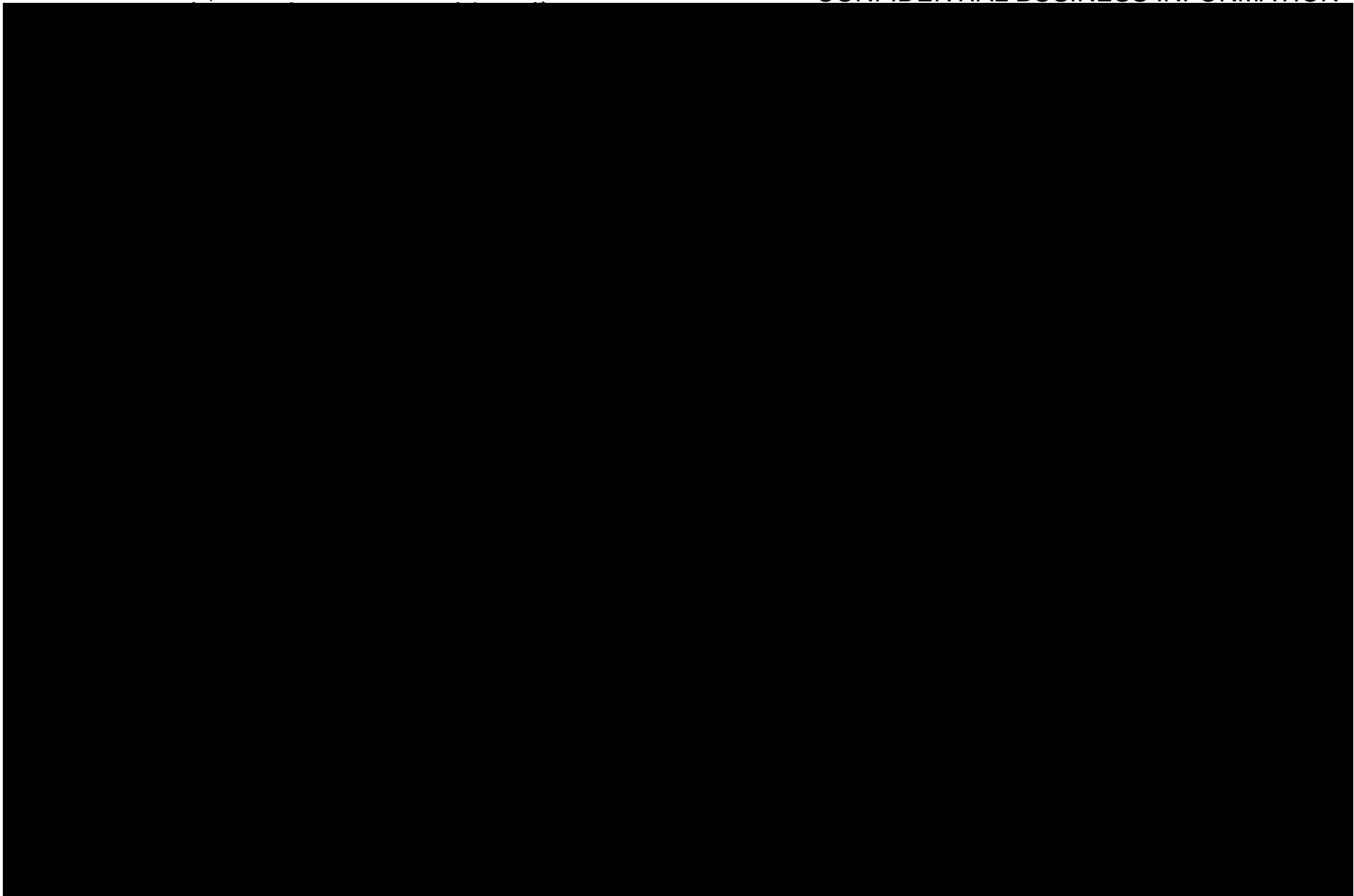
落下検知後の閉まり速度は、P3～P5参照ください。



落下検知確定後のAUTO CLOSE作動での速度は正常時と同様に目標速度をなぞるようにAUTO CLOSEしている→AUTO CLOSEは制御された速度で閉まっている。



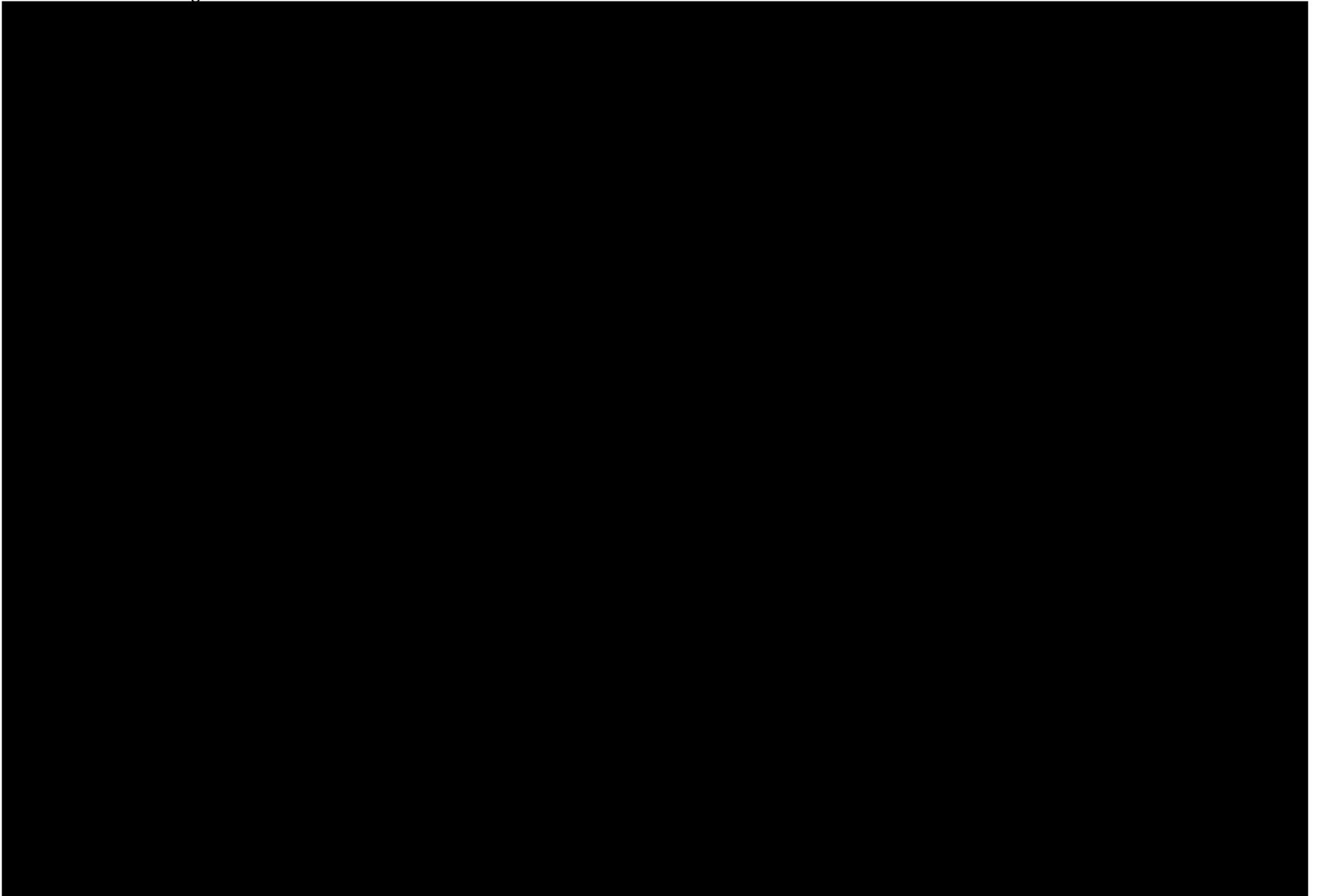
落下検知確定後のAUTO CLOSE作動での速度は正常時と同様に目標速度をなぞるようにAUTO CLOSEしている→AUTO CLOSEは制御された速度で閉まっている。



落下検知確定後のAUTO CLOSE作動での速度は正常時と同様に目標速度をなぞるようにAUTO CLOSEしている→AUTO CLOSEは制御された速度で閉まっている。

Attachment #14

English Translation

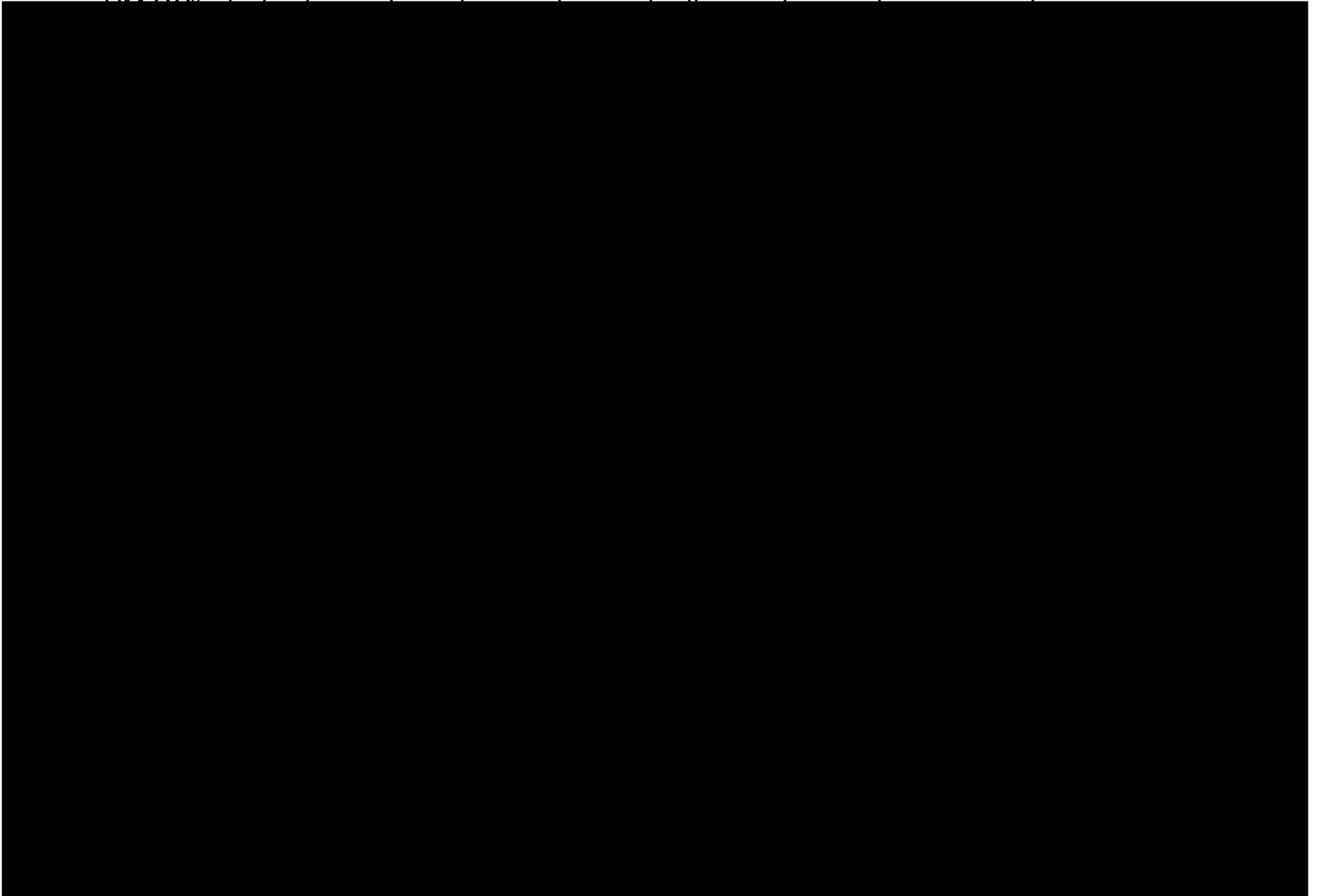


【Verification method】

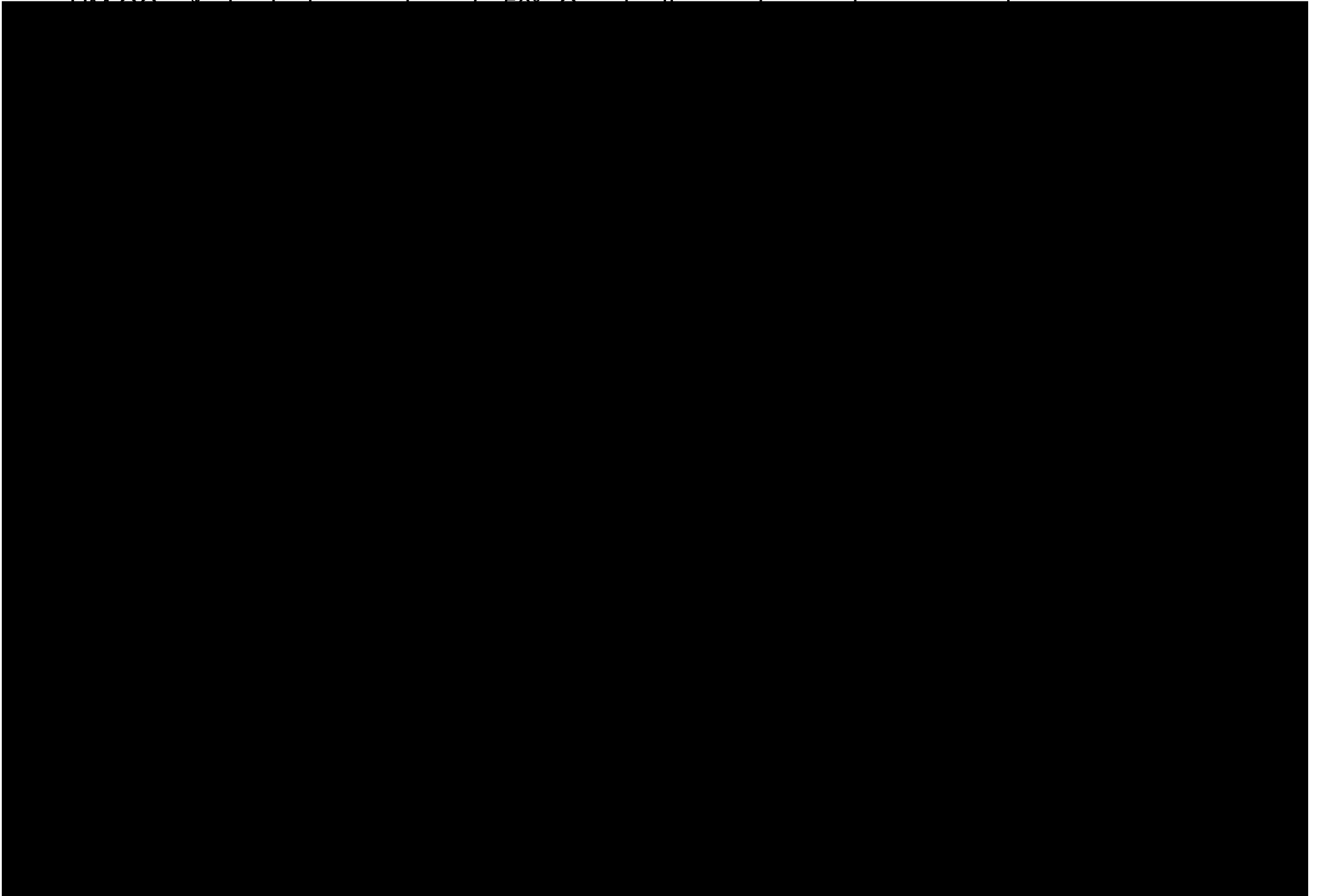
Verification is conducted with one of the open stays removed so that the tailgate will always set up a motion subject to falling detection.

【Measurement result】

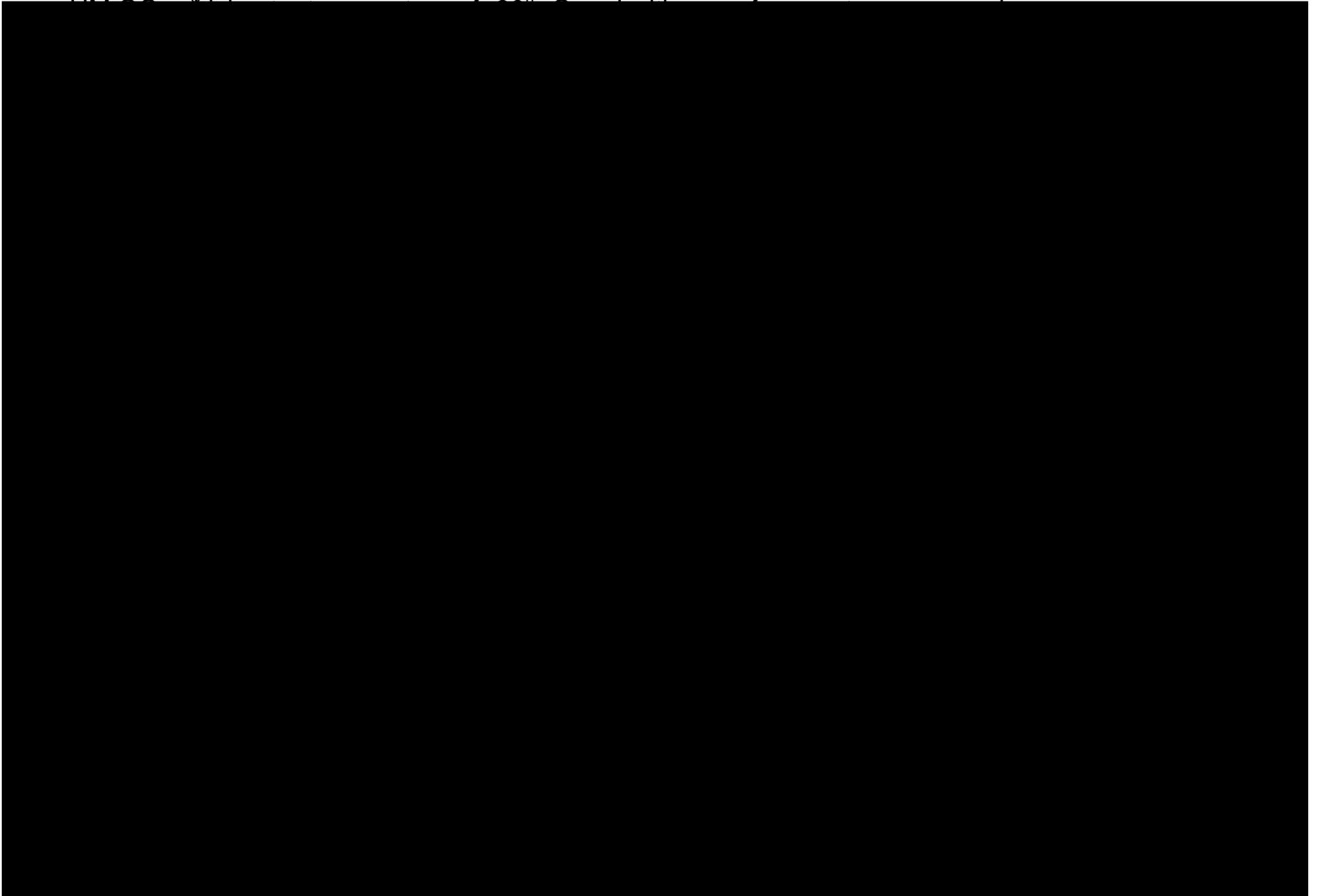
Refer to pages 3 to 5 for closing speed after falling detection.



So far as the AUTO CLOSE motion after falling detection is concerned, the speed follows the target speed curve until AUTO CLOSE is accomplished just as it does under normal conditions, indicating that the tailgate closes at a controlled speed in the AUTO CLOSE mode.



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Attachment #16

EA08-015
Dec. 5, 2008

Q16
COMPONENT SALES HISTORY
AS OF 11/30/08

PART DESC	SERVICE PART NO.	MODEL APPLICATION	CALENDAR YEAR				
			2004	2005	2006	2007	2008
STAY, TAILGATE OPEN	74820-SHJ-A61	2005-2007 Odyssey	53	917	2166	3453	4316*

*Parts demand thru Nov.
2008

24-MONTH HISTORY	
Dec-06	123
Jan-07	208
Feb-07	151
Mar-07	248
Apr-07	350
May-07	405
Jun-07	354
Jul-07	318
Aug-07	388
Sep-07	302
Oct-07	300
Nov-07	245
Dec-07	184
Jan-08	252
Feb-08	273
Mar-08	337
Apr-08	413
May-08	448
Jun-08	614
Jul-08	646
Aug-08	422
Sep-08	353
Oct-08	300
Nov-08	258