

Getting EDR Data from unsupported Fords

Richard R. Ruth, P.E.

(this copy has been updated 4-01-2021, after the original presentation at the Jan 2016 CDR Summit)



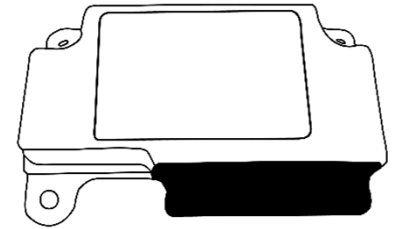
Richard R. Ruth, P.E.



- 33 Years with Ford Motor Company Product Engineering and Planning
- Manager - safety related investigations
- Lead Field User of EDR's
- Retired end 2006
- Consultant specializing in EDR's
 - Interpretation and Admissibility
- EDR Instructor for IPTM and SAE
- Research EDR Accuracy & Publish



Why not supported?



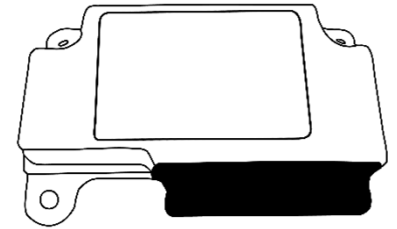
- No data worth getting
- Protect Owner Privacy
- Technical reasons
- Workload Reasons
 - Auto Industry Tanked in 2007/2008
 - GM& Chrysler went bankrupt
 - Ford didn't – laser sharp focus
 - “If it doesn't sell more cars or improve quality- don't do it”



Ford Supplier Name Evolution

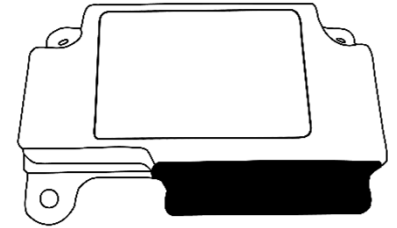
- Early Suppliers were **SIEMENS** and **FORD VISTEON** in US, (components division spun off like GM did Delphi), **TAKATA**, and **BOSCH** in Europe
- Ford wanted restraint system suppliers to be “Full Service” – Belts, Bags, ACM’s
- **AUTOLIV** buys Visteon ACM piece in 2002
- **CONTINENTAL** buys SIEMENS ACM piece
- **TAKATA** already had both. **TAKATA** later ruined by airbag inflator recall. Goes bankrupt.
- Europeans kept **BOSCH**
- **AUTOLIV** spins off electronics as **VEONEER** in 2018

Major Groups of Unsupported



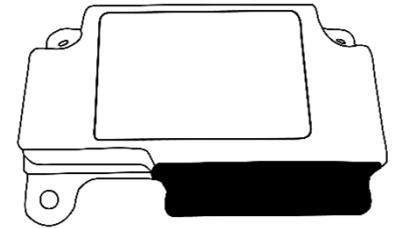
- Vehicles with little useful data – low priority
- Vehicles built prior to August 1, 2000 – owner privacy
- Autoliv ARM 400's – technical issues
- Mid/Late 2000's Vehicles Later vehicles – workload
- Ford PCM's 2007+ - workload

Vehicles Built Before Aug. 1, 2000



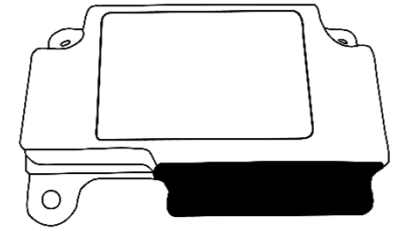
- Very limited data – not really thought to be an “EDR”
- “EDR Disclosure” in owner guide inserted for 2001 MY
- Protect owner privacy in earlier vehicles
 - Force requestors to show written owner consent or sufficient legal authority

Vehicles built prior to Aug 2000



	Model Year	1997	1998	1999	2000	2001
Ford/M	Contour/Mystique			AUTOLIV 116msX	AUTOLIV 116msX	
Ford/M	Crown Vic/Gr Marq		CONTI 220msX	CONTI 220msX	CONTI 116msX	
Ford	Econoline	CONTI 70msX	CONTI 70msX	CONTI 70msX	CONTI 70msX	
Ford	Escort		AUTOLIV 220msX	AUTOLIV 220msX	AUTOLIV 116msX	
Ford	Excursion				CONTI 220msX	
Ford	Expedition			No Recon Data	AUTOLIV 116msX	
Ford	Explorer (4 dr & old 2 dr)			No Recon Data	No Recon Data	
Ford	F-150			AUTOLIV 116msX	AUTOLIV 116msX	**
Ford	Focus				No Recon Data	
Ford	Mustang			AUTOLIV 116msX	AUTOLIV 116msX	
Ford	Ranger		CONTI 220msX	AUTOLIV 116msX	AUTOLIV 116msX	
Ford	Super Duty F250+			CONTI 220msX	CONTI 220msX	
Ford/M	Taurus/Sable		AUTOLIV 220msX	AUTOLIV 220msX	AUTOLIV 78msXY	
Ford	Windstar			CONTI 116msX	CONTI 116msX	
Lincoln	Continental		AUTOLIV 220msX	AUTOLIV 116msX	AUTOLIV 116msX	
Lincoln	LS			AUTOLIV 116msX	AUTOLIV 116msX	
Lincoln	Navigator			No Recon Data	AUTOLIV 116msX	
Lincoln	Town Car		CONTI 220msX	CONTI 116msX	CONTI 116msX	
Mercury	Cougar			AUTOLIV msX	AUTOLIV msX	
**Some 2001 Ford F150 were built Feb-July August 1, 2000						

Details of Pre-2001's

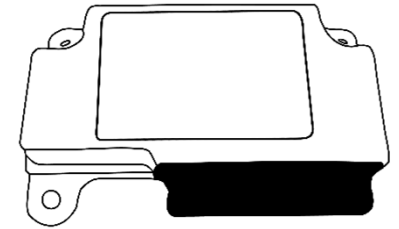


- 1997-2003 Econoline – First **E**lectronic **C**rash **S**ensor ECS
70ms X Acceleration at 1ms intervals
 - Insufficient duration to capture most frontal crash pulses
- New for 1998's – “ECS1” – 28 pin Single Oval Connector
 - 220 ms X Acceleration at 1ms intervals
 - Approx 100ms before wakeup, 120ms after
- New for 1999 – “RCM” – Two connectors (2nd for SAB)
 - 116 ms X Acceleration at 1ms intervals after wake-up

ACM FAULT CODE HISTORY - NO PRECRASH – NO BELT USE

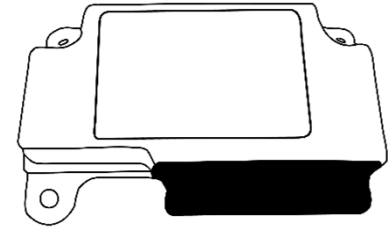
- New for 2000 – “ARM100” Taurus – 78ms X&Y, Belt Use

Recording Details



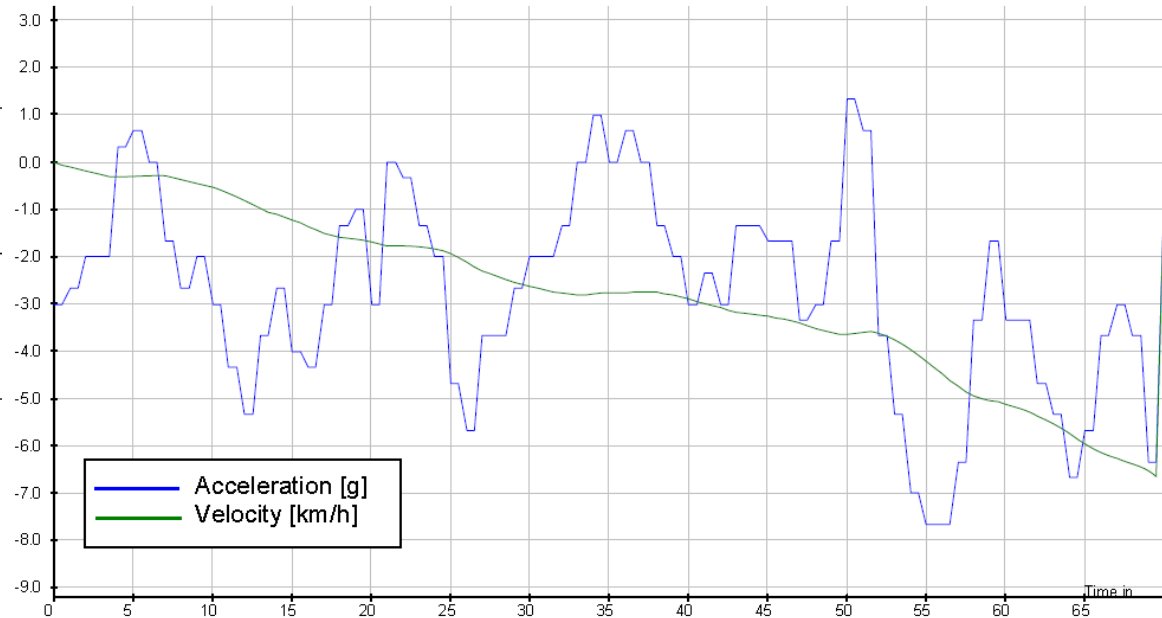
- Requires frontal algorithm wake up (not designed to capture rear impacts)
- Single Event Capability
- Records D's or ND's, D's take priority
- ND threshold is low – some wakeup, some 1-4mph DV
- No backup power supply for recording – nothing captured when power loss at impact
- No “Event Recording Complete”
- No Key Cycles
- Retains ND's forever or until next event

97-03 Econoline Report

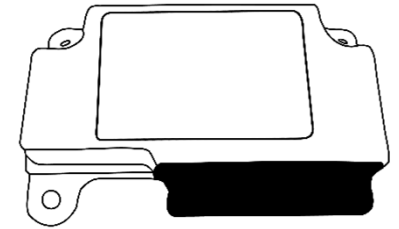


B. Stored Codes:

Fault	Active Counter	Passive Counter	Comment
Crash data stored in module	0x09	0x83	This condition was active for 9 key cycles during the life of the vehicle. It has not been active for last 3 key cycles.
Battery Voltage out of range	0x02	0x7E	This condition was active on 2 different key cycles during the life of the vehicle. It has not been active for at least 126 key cycles and is currently masked.
Airbag warning indicator failure	0x76	0x7E	
Driver seat belt pretensioner squib resistance fault	0x07	0x7E	
Passenger seat belt pretensioner squib resistance fault	0x07	0x7E	



Early Supplier Identification

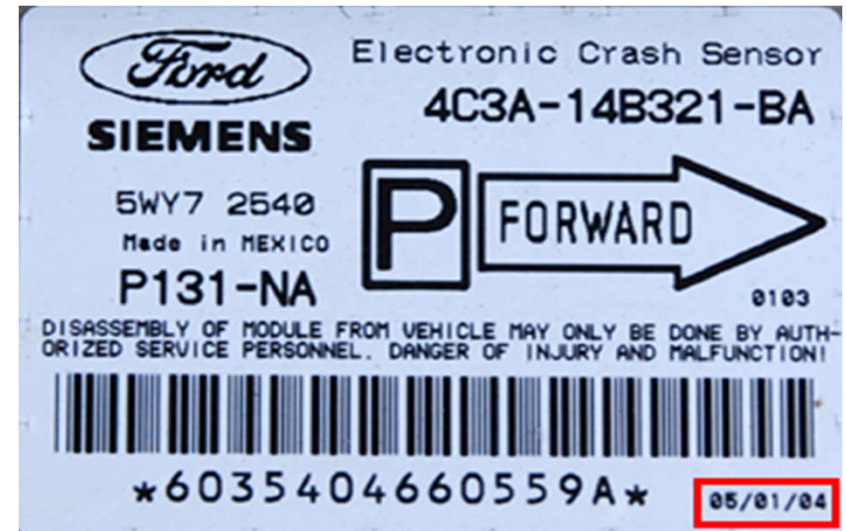


AUTOLIV (now Veoneer)



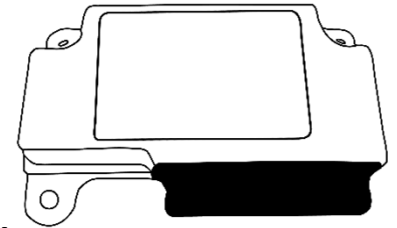
- Made in **CANADA**
- Only Ford Logo
(Visteon was Ford then)

CONTINENTAL



- Formerly SIEMENS name on the part no. sticker
- Made in **MEXICO**

Veoneer Contact Information



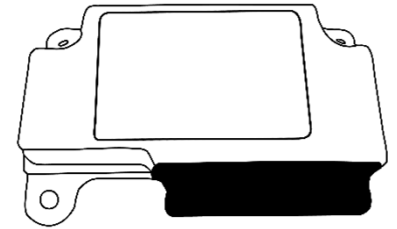
Autoliv Electronics has been spun off from the main Autoliv airbag and seat belt company as of June 29, 2018 as a separate company, Veoneer. Autoliv stockholders each got one share of Veoneer per share of Autoliv. Eric Swanson, formerly of Autoliv, is now VP legal of Veoneer. Email addresses changed from @autoliv to @veoneer.

- deborah.cox@veoneer.com receives requests, she is paralegal to Eric Swanson (rcmdownload @veoneer.com deactivated) Please understand helping you is NOT their main job, this is a distraction to their normal work – please DO NOT expect immediate answers – some inquirers report LONG delays in responses

Recent responses from Veoneer say that they are no longer capable of downloading ACM's more than 15 years old. The employee who knew all the old stuff retired in Feb 2019. (I am working to get the retired guy to go back and train the current one).

MANY EMPLOYEES ARE WORKING REMOTELY AND NOT GOING IN THE OFFICE WHERE LABS WITH HARDWARE/SOFTWARE TO READ ACM'S IS

Contact Information as of 4/17 (case specific inquiries only)

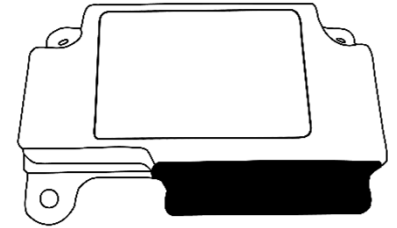


CONTINENTAL

- Chris S. Egner, Attorney
Global Expert Team - Product Liability / Product Integrity
Continental Law Department
Chris.Egner@continental-corporation.com
[1830 MacMillan Park Dr.](#)
[Fort Mill, SC 29707](#)

(previous contact was Shannon Peters)

Cost (as of last inquiries)



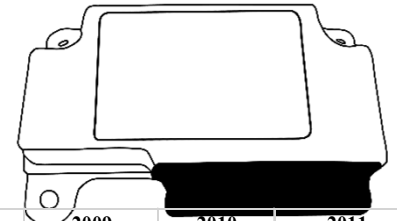
VEONEER (former AUTOLIV)

- \$2000 (if you send the module in) (was \$800, then \$1000, increased spring 19)
- No exception for law enforcement (Price is Autoliv's internal cost)
- Under RARE case specific circumstances, other services at cost

CONTINENTAL

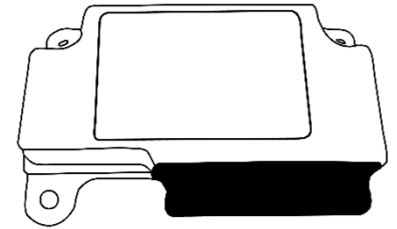
- No charge for law enforcement
- Private parties \$1500 as of May 2018 (was 1000)

Mid-Late 2000's – Big Picture



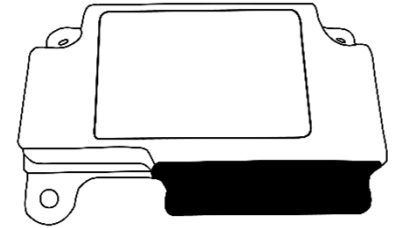
Model Year		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Ford/M	500/MONTEGO/FREESYLE					CONTI PC+X						
F	EDGE							SUPPORTED PC+X				
Ford/M	FUSION/MILAN						SUPPORTED PC+X		AUTOLIV RC5P PC+X		SUPPORTED PC+XY	
M	COUGAR	AUTOLIV										
Ford/M	CR VIC/GR MARQUIS	SUPPORTED										
Ford	ECONOLINE	CONTI 70ms X			CONTI 250ms X						SUPPORTED PC+XY	
Ford	ESCAPE	SUPPORTED				AUTOLIV ARM 120msX			AUTOLIV RC5P	SUPPORTED PC+XY		
Ford	ESCORT	SUPPORTED DLC only										
Ford	EXCURSION	SUPPORTED										
Ford	EXPEDITION	SUPPORTED		AUTOLIV ARM 120msX				AUTOLIV RC5P PC+X				SUPPORTED
Ford	EXPLORER (4 dr & old 2 dr)	No Recon Data	AUTOLIV ARM 120msX				SUPPORTED PC+X			AUTOLIV RC5P PC+X		SUPPORTED
Ford	EXPLORER SPORT (new 2 dr)	SUPPORTED										
Ford	F-150	SUPPORTED			AUTOLIV ARM 120msX					SUPPORTED PC+XY		
Ford	FIESTA											SUPPORTED
Ford	FLEX								CONTI		SUPPORTED PC+XY	
Ford	FOCUS	No Recon Data	BOSCH AB8E (XDV<15mph only)			BOSCH AB9 PC+XY			SUPPORTED PC +			
Ford	MUSTANG	SUPPORTED				AUTOLIV ARM 120msX			? AUTOLIV		SUPPORTED PC+XY	
Ford	RANGER	SUPPORTED						AUTOLIV RC5P PC+X			SUPPORTED PC+XY	
Ford	SPORT TRAC (pickup bed)	SUPPORTED		AUTOLIV ARM 120msX				SUPPORTED PC+X		AUTOLIV RC5P PC+X		?
Ford	SUPER DUTY F250+	SUPPORTED						CONTI 116ms X	CONTI PC+240X			SUPPORTED
Ford/M	TAURUS/SABLE/TaurusX	SUPPORTED	AUTOLIV ARM 120msX						CONTI PC+X		SUPPORTED PC+XY	
Ford	T-BIRD											
Ford	TRANSIT CONNECT											BOSCH AB9
Ford	WINDSTAR/FREESTAR	SUPPORTED			FORD (TAKATA)							
Lincoln	CONTINENTAL	SUPPORTED										
Lincoln	LS	SUPPORTED		AUTOLIV ARM 120msX								
Lincoln	MKS (Taurus Platform)										SUPPORTED PC+XY	
Lincoln	MKT (Flex Platform)'10										SUPPORTED PC+XY	
Lincoln	MKX (Edge Platform)							SUPPORTED PC+X			SUPPORTED	
Lincoln	NAVIGATOR (Expedition)	SUPPORTED		AUTOLIV ARM 120msX				AUTOLIV RC5P PC+X				SUPPORTED
Lincoln	TOWN CAR (Cr Vic Platform)	SUPPORTED										
Lincoln	ZEPHYR/MKZ (Fusion platform)						SUPPORTED PC+X		AUTOLIV RC5P PC+X		SUPPORTED PC+XY	
		Color Codes Signify Data Available										
		DV only	DV + Belt Use	RECRASH DATA	Near 563 Inten	NOT SURE						

Autoliv ARM (Advanced) Series



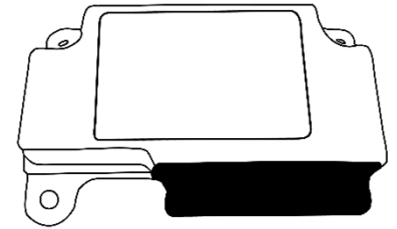
Model Year		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
FORD	ESCAPE	SUPPORTED	AUTOLIV ARM 120msX			AUTOLIV ARM 120msX		AUTOLIV RC5P		SUPPORTED PC+XY		
FORD	EXPEDITION	SUPPORTED	AUTOLIV ARM 120msX			AUTOLIV ARM 120msX		AUTOLIV RC5P PC+X		SUPPORTED		SUPPORTED
FORD	EXPLORER (4 dr & old 2 dr)	No Recon Data	AUTOLIV ARM 120msX			SUPPORTED PC+X		AUTOLIV RC5P PC+X		SUPPORTED		SUPPORTED
FORD	F-150	SUPPORTED	AUTOLIV ARM 120msX			AUTOLIV ARM 120msX		SUPPORTED PC+X		SUPPORTED PC+XY		
FORD	MUSTANG	SUPPORTED	AUTOLIV ARM 120msX			AUTOLIV ARM 120msX		? AUTOLIV		SUPPORTED PC+XY		
FORD	SPORT TRAC (pickup bed)	SUPPORTED	AUTOLIV ARM 120msX			SUPPORTED PC+X		AUTOLIV RC5P PC+X		?		
FORD/M	TAURUS/SABLE/TaurusX	SUPPORTED	AUTOLIV ARM 120msX			SUPPORTED PC+X		CONTI PC+X		SUPPORTED PC+XY		
LINCOLN	LS	SUPPORTED	AUTOLIV ARM 120msX			SUPPORTED PC+X		SUPPORTED PC+X		SUPPORTED PC+XY		
LINCOLN	NAVIGATOR (Expedition)	SUPPORTED	AUTOLIV ARM 120msX			SUPPORTED PC+X		AUTOLIV RC5P PC+X		SUPPORTED		SUPPORTED
		Color Codes Signify Data Available										
		DV only	DV + Belt Use	PRECRASH DATA	Near 563 Intent	NOT SURE						

Autoliv ARM (Advanced Restraint)



- Must be sent to Autoliv for technical reasons
- No Pre-crash Data
- 120ms X Delta V
- Driver and Passenger Seat Belt Use
- Restraint System Fault Code History
- One Event Capability –D's take priority
- ND's and D's
- Records on front algo wakeup with - 1mph Delta V
- New ND's replace old, but magnitudes 1-4mph XDV won't overwrite magnitudes >4mph

ARM Deploy Times & Belt Status



RESTRAINT CONTROL MODULE ANALYSIS

1. The restraint control module recorded a command to deploy the following restraints at the following fire times. The fire times are referenced to frontal algorithm wakeup:

- Driver Front Pretensioner = 98.608ms
- Passenger Front Pretensioner = 98.608ms

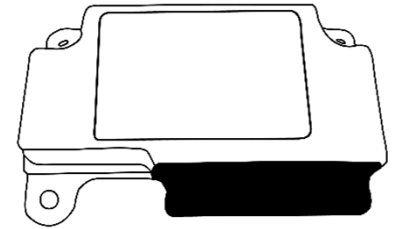
The safing criteria was met 1ms after algorithm wakeup. There were between 16 to 18 minutes from key-on until frontal algorithm wakeup.

2. The system status was the following at the time of the event:

- Driver Seat Track "Normal"
- Driver "Buckled"
- Passenger "Buckled",
- Passenger Seat "Large"

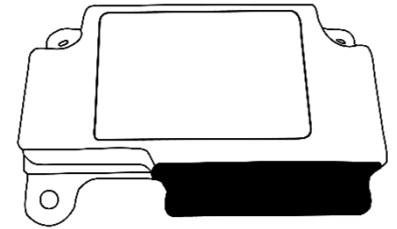
3. There were no diagnostic codes detected between key-on and the onset of the event.

ARM Sample Report Diagnostics (All Autoliv have a similar section)



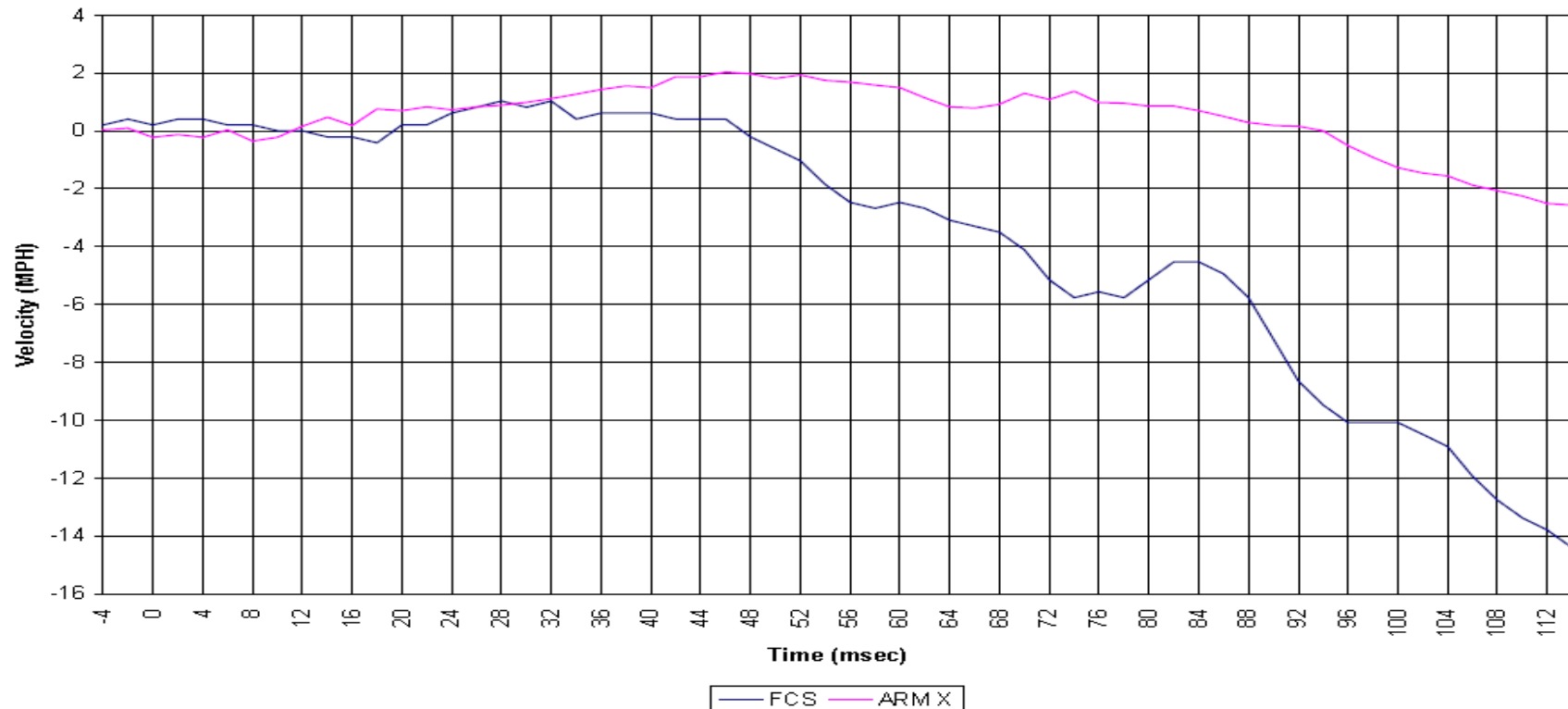
RESTRAINT CONTROL MODULE DIAGNOSTIC CODES	
(Codes are listed in the order in which they are detected)	
CRASH_MEMORY_FULL	
9	Key-ons with the code present
0	Key-ons since the code was last detected
OCS_COMMUNICATION	
1	Key-ons with the code present
4	Key-ons since the code was last detected
PASSENGER_PRETENSIONER_RESISTANCE_HIGH	
5	Key-ons with the code present
0	Key-ons since the code was last detected
DRIVER_PRETENSIONER_RESISTANCE_HIGH	
5	Key-ons with the code present
0	Key-ons since the code was last detected
PASSENGER_PRETENSIONER_LEAK_LOW	
1	Key-ons with the code present
2	Key-ons since the code was last detected

ARM Sample Report – DV (An accel graph is also provided)

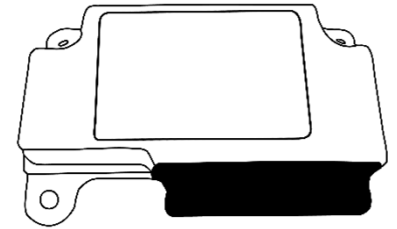


Acceleration and Delta Velocity Charts

Frontal Algorithm Velocity Crash Data
(0msec = Algorithm Wakeup)

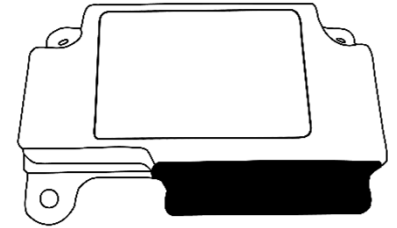


Ford Focus (Bosch) 2000-2007



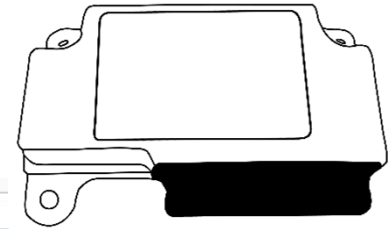
Model Year	2000	2001	2002	2003	2004	2005	2006	2007
Focus	No Recon Data		BOSCH AB8E (XDV<15mph only)			BOSCH AB9 Speed+XY Max		
		Color Codes Signify Data Available						
		DV only	DV + Belt Use	PRECRASH DATA				

FOCUS (Bosch)



- 2000-2001 AB8 No useful data (32ms accel graph)
- 2002-2004 AB8E very limited – max X and Y DV, but max value is limited (28 kph??). No precrash.
- 2005-2007 AB9
 - Single value for speed prior to impact (time not specified – 0.1 sec?)
 - No brake or accel pedal information
 - Single Value for Max X and Y Delta V up to 28 kph and time duration
- Contact: paralegal Gina.Gelement@us.bosch.com
38000 Hills Tech Drive
Farmington Hills, MI 48331 USA
(Gina replaced Susan Brey)
- Law enforcement No charge, Private parties \$1000

Sample of 2005-2007 Focus Data



System status at Time of Retrieval

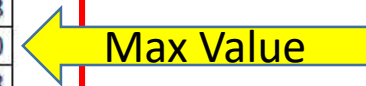
VIN	[REDACTED]
Ignition Cycle	39970

ECU Fault Status

No faults

System Status at Event

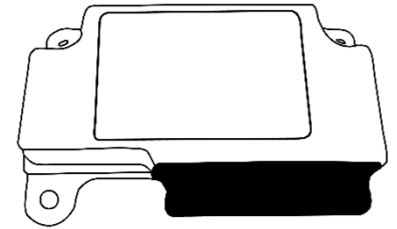
Complete File Recorded	Yes
Event Number	2
Lifetime Operating Timer at beginning of event (h:mm:ss)	6515:03:27
Vehicle Speed (km/h)	53.5
Vehicle Voltage at beginning of event (V)	14.2
Energy Reserve at beginning of event (V)	33.5
Driver seat belt buckle switch status	buckled
Passenger seat belt buckle switch status	unbuckled
Seat track position sensor status	back
Occupant classification status	empty
Longitudinal max DV (km/h)	26.9
Time max longitudinal DV (ms)	188
Lateral max DV (km/h)	28.0
Time max lateral DV (ms)	68



Device Deployment Time

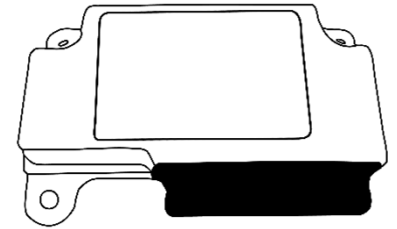
Airbag 1 Front Driver (ms)	18.0
Airbag 2 Front Driver (ms)	118.0
Seat belt pretensioner Front Left (ms)	2.5

2004-2007 Freestar (TAKATA)



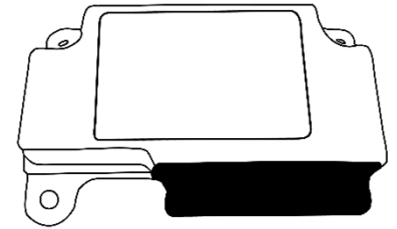
- Must be sent to Ford to send to Takata
- No Precrash Data
- 142 X Acceleration Data Points @ 1.0ms before wakeup, 0.8ms after wakeup
- Some before wakeup, always 50ms after Deployment
- Driver and Passenger Seat Belt Use
- Restraint System Fault Code History
- One Event Capability –D's take priority
- ND's and D's
- Records on front algo wakeup + ?mph Delta V
- Contact: EDRFORD@FORD.COM
- Takata is in bankruptcy due to big airbag recall, it is not clear how much longer this data will be available

Autoliv RC5P Series (Replaced supported RC5 in 07/08)



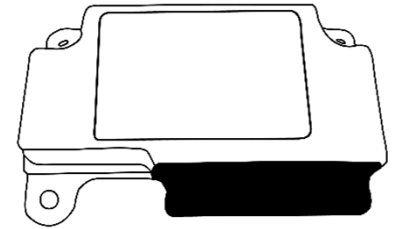
RC5P	Model Year	2006	2007	2008	2009	2010	2011
Ford/M	Fusion/Milan	Supported PC+X		AUTOLIV RC5P PC+X		Supported PC+XY	
Ford	Escape			AUTOLIV RC5P	Supported PC+XY		
Ford	Expedition		AUTOLIV RC5P PC+X				Supported
Ford	Explorer (4 dr & old 2 dr)	Supported PC+X			AUTOLIV RC5P PC+X		Supported
Ford	Mustang			? AUTOLIV		Supported PC+XY	
Ford	Ranger		AUTOLIV RC5P PC+X			Supported PC+XY	
Ford	Sport Trac (pickup bed)		Supported PC+X		AUTOLIV RC5P PC+X		?
Lincoln	Navigator (Expedition)		AUTOLIV RC5P PC+X				Supported
Lincoln	Zephyr/MKZ (Fusion platform)	Supported PC+X		AUTOLIV RC5P PC+X		Supported PC+XY	

Autoliv RC5P Series (2007-10)



- Same Data as supported RC5 Models
- Pre-crash Data -5 to -1 at 1 second intervals
- 240ms X Delta V from RCM, 60ms Front Crash Sensor(FCS). Frontal crashes may have no YDV.
- RC5 Side data recorded in separate event, 0-58ms @2ms (RC5P presumed same)
- Driver and Passenger Seat Belt Use
- Restraint System Fault Code History
- ND's and D's
- Recording threshold for RC5 is believed to be +/- 5mph, RC5P is likely same. There are no data limitations.

Autoliv RC5P Sample Report 1

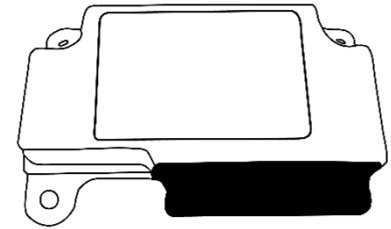


1. The restraint control module recorded a command to deploy the following restraints at the following fire times. The fire times are referenced to frontal algorithm wakeup:

- Driver Front Retractor Pretensioner = 14ms
- Passenger Front Retractor Pretensioner = 14ms
- Driver Front Pretensioner = 19ms
- Passenger Front Pretensioner = 19ms
- Driver Front Airbag Stage 1 = 21ms
- Driver Front Airbag Stage 2 (Disposal after 121ms)

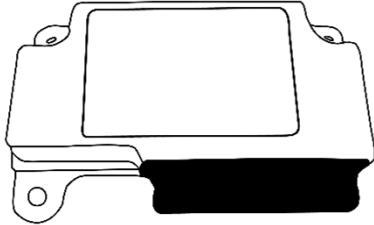
There were 5.5 minutes from key-on until frontal algorithm wakeup.

Autoliv RC5P Precrash Data (Same as supported RC5)

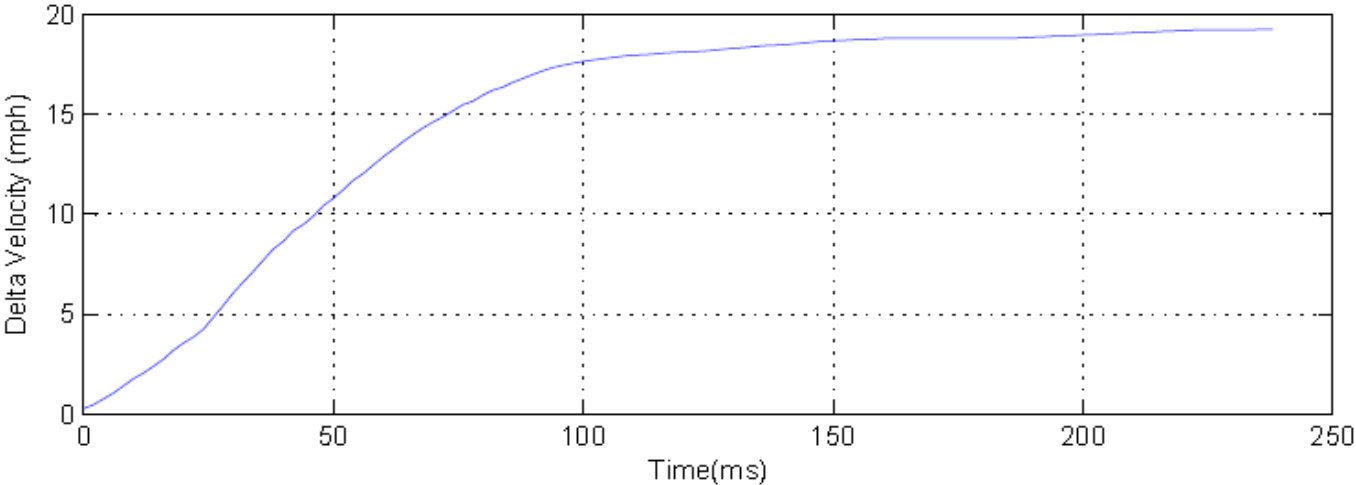
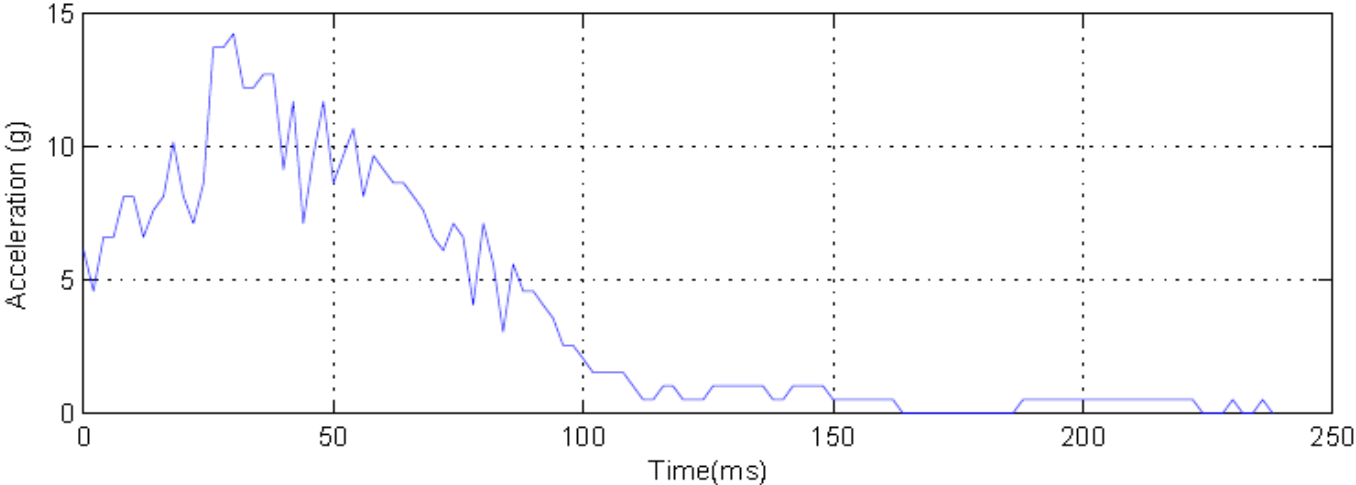


EVENT RECORD								
47832.25		Time of Power Loss from the Start of the Event (ms)						30
PRE-CRASH DATA								
Time Before Event (seconds)	Vehicle Speed (km/h)	Throttle Position (%)	Stability Control in Progress (Yes/No)	ABS in Progress (Yes/No)	TC Brake in Progress (Yes/No)	TC Engine in Progress (Yes/No)	Brake Depressed (Yes/No)	Passenger Occupant Classification
5	71.76	9	No	No	No	No	No	Child
4	72.58	7.5	No	No	No	No	No	Child
3	72.85	10	No	No	No	No	No	Child
2	71.71	0	No	No	No	No	No	Child
1	70.20	0	No	No	No	No	No	Child

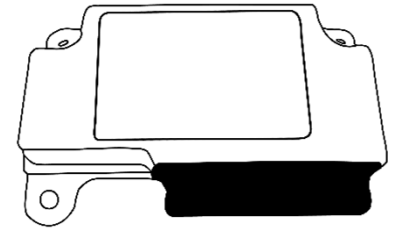
RC5P DV 240+ms RCM (FCS 60ms)



Event Record 1 - Front - RCM X



Continental 2008 F250+ Precrash Data



B. Data from Vehicle CAN bus:

The table below contains vehicle information that is stored in 1 second intervals and is centered on the crash event.

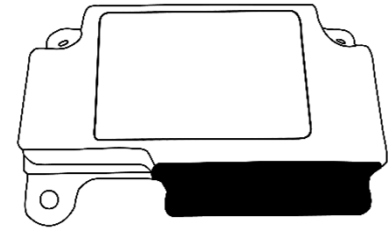
Event Time Line

Time (Seconds)	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7
Vehicle Speed (mph)				82.65	83.89	85.75	87.62	67.73	32.93	19.88	16.16	5.59	0.00			
Accelerator position (%)				100.00	100.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Brake lamp SW depressed	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0
ABS Event	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0
TCS Engine Event	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RIL Status	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Some Diesels and F450/F550 may NOT populate the precrash data section.
CAN bus may not be present or speak same language

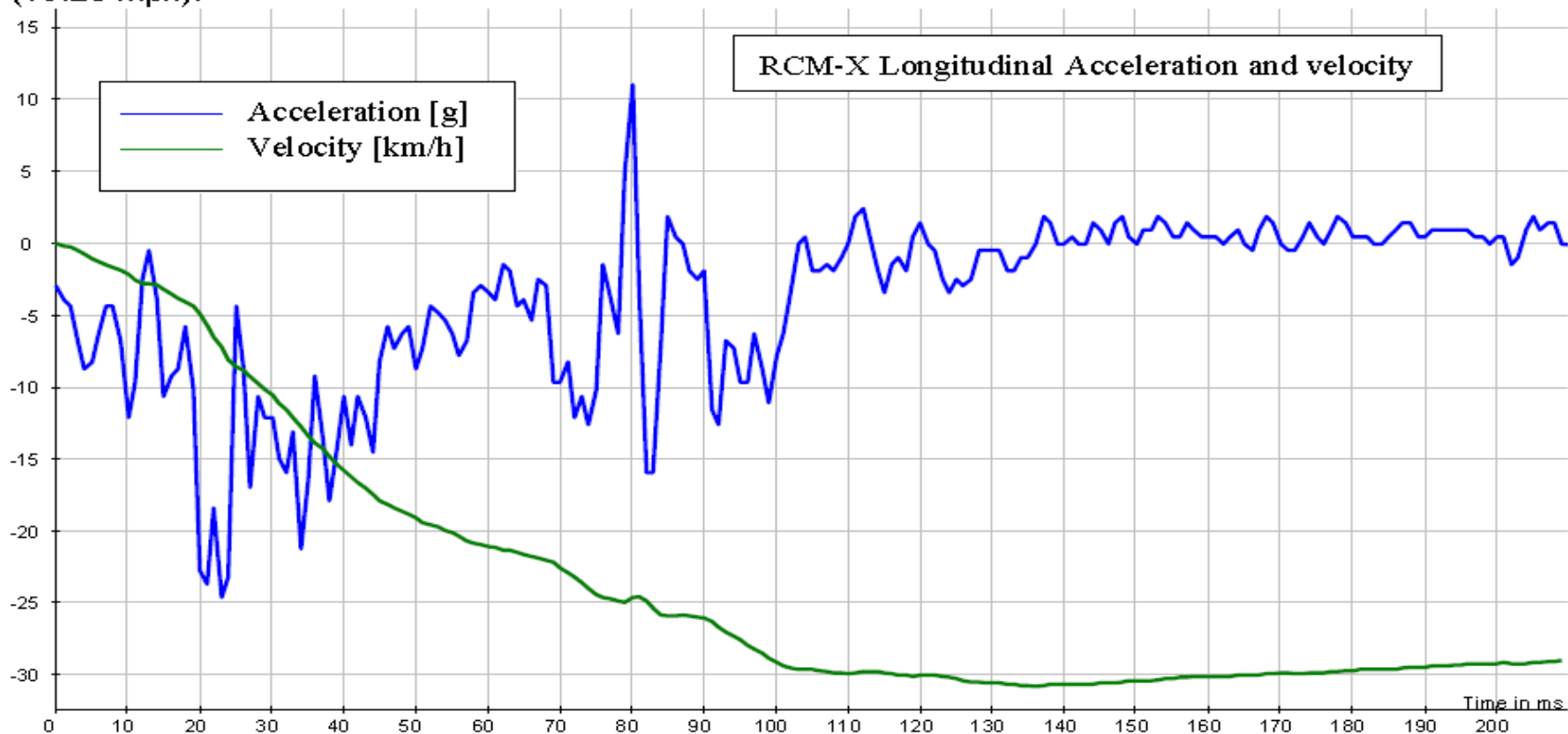
2008 F250+ Conti Delta V_x 210ms

(Data also included from front crash sensor FCS)

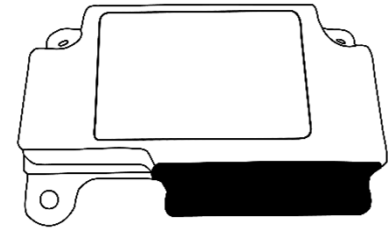


A. Results

The following is a plot of the acceleration in g's and the velocity change in km/h from the RCM longitudinal sensor for this event. The longitudinal velocity change was approximately 31 km/h (19.25 mph).



Continental 2008+ Taurus



- Similar to 2008 F250 Except:
 - FCS Delta V is 60ms duration (RCM still 210ms)

B. Data from Vehicle CAN bus:

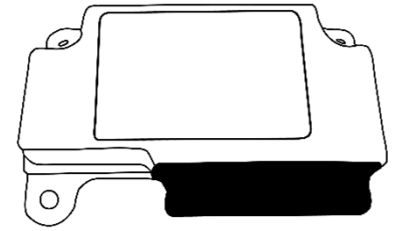
The table below contains vehicle information that is stored in 1 second intervals and is centered on the crash event.

Vehicle Data:	-5	-4	-3	-2	-1	0	1	2	3	4
Accelerator Pedal Position (%):	0	0	0	0	0	0	0	0	0	0
Vehicle Speed (kph):	119.43	119.42	119.36	119.43	119.32	44.029999	31.909999	25.01	21.62	22.19
Speed Contrl Status:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RIL Status:	Off	Off	Off	Off	Off	On	On	On	On	On
BrkLampSwitch Status:	No	No	No	No	No	No	No	No	No	No
ABS_EvtInProgress:	No	No	No	No	No	No	No	No	Yes	No
TCS_EngEvtInProgress:	No	No	No	No	No	No	No	No	No	No
TCS_BrkEvtInProgress:	No	No	No	No	No	No	No	No	No	No
ESP_EvtInProgress:	No	No	No	No	No	No	No	No	No	No

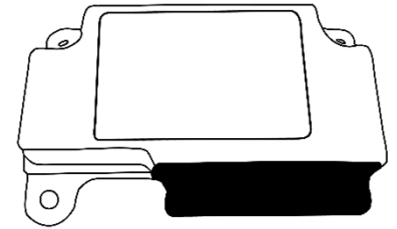
2005+ Ford 500/FreeSTYLE believed similar but have not seen one to know for sure!

Continental 2009 Ford Flex

- Content believer similar to 2008 Taurus

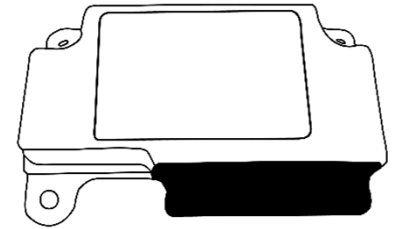


Ford Transit Connect 2010+ (small van)



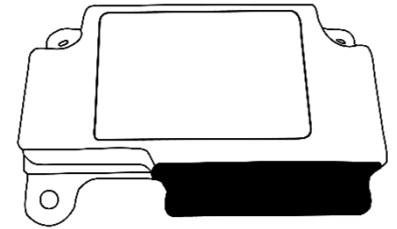
- Bosch AB9 ACM similar to 2005-2007 Focus
- 2018 response from Ford indicates it will not record in rear impacts (no integrated fuel cutoff feature)
- May record throttle position, brake actuation, vehicle speed,
- Front seat belt buckle status, front passenger presence, deployment times for restraint devices, and diagnostic codes related to the restraint system.
- X and Y Accel and Delta V
- Per Gina Gelement, Send to Bosch Budapest office for readout
- Transit Connect becomes supported by CDR 2013
- Full-size Transit (Econoline Replacement) covered by CDR 2015.

Unsupported Ford PCM's



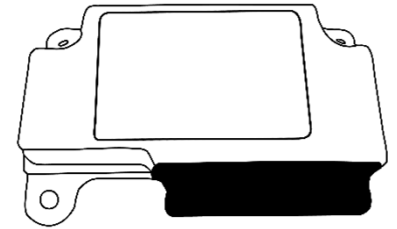
- Many Ford PCM's with EDR Data are supported- those made by Visteon and Continental (formerly Motorola)
- Only Fords with Electronic Throttle Control and gas engines have an EDR memory chip in them
- A few with EDR chips are not supported
- Ford will read any unsupported PCM's for you
- A few can be read by CDR using surrogate VINS

Unsupported Ford PCM's



Model Year	2007	2008	2009	2010	2011
Econoline	Supported	Supported	New RCM	New RCM	New RCM
Escape* (hybrid 05-08 Ford)	No ETC gas*	No ETC gas*	New RCM	New RCM	New RCM
F-150	Supported	Supported	New RCM	New RCM	New RCM
Expedition** some 07 Bosch	Supported **	FORD Bosch	FORD Bosch	?	New RCM
Navigator**some 07 Bosch	Supported **	FORD Bosch	FORD Bosch	?	New RCM
Ranger	No ETC	No ETC	No ETC	New RCM	New RCM
Super Duty F	Supported	FORD/?	FORD/?	FORD/?	New RCM
Explorer (4 dr & old 2 dr)	Supported	Supported	Supported	Supported	New RCM
Aviator	Supported				
Sport Trac (pickup bed)	Supported	Supported	Supported	Supported	New RCM
Windstar/Freestar	No ETC				
Focus	No ETC	FORD	FORD	FORD	FORD
Mustang	Supported	FORD/Surrogate	FORD/?	New RCM***	New RCM
T-bird	Supported				
Taurus/Sable/TaurusX	Supported	FORD/Surrogate	FORD/?	New RCM	New RCM
500/Montego/Freestyle	Supported				
Crown Vic/Grand Marquis	Supported	Supported	Supported	Supported	Supported
Town Car	Supported	Supported	Supported	Supported	Supported
Fusion/Milan/Zephyr/MKZ	Supported	FORD/Surrogate	FORD/?	New RCM	New RCM
Edge/MKX	Supported	Supported	Supported	Supported	New RCM
FLEX/MKT '10			FORD/Surrogate	New RCM	New RCM
Fiesta					New RCM
MKS				New RCM	New RCM
Transit Connect				?	FORD
COLOR CODES	Supported	by Bosch CDR system software			
	FORD/Surrogate	Surrogate VIN has been tested and works			
	FORD/?	Surrogate VIN may work but has not been tested by this author			
= PCM data reported	New RCM	Vehicle has nearly 563 intent RCM, PCM should no longer have a separate memory chip			
	FORD Bosch	Must be read out by Ford and interpreted by Bosch PCM engineers			
	FORD	Must be read out by Ford - new communication protocol			

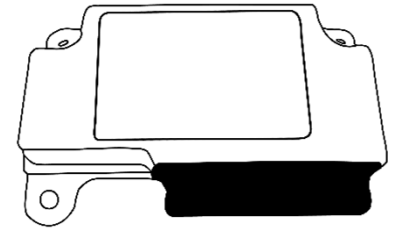
Reading with Surrogate VIN – DON'T DO IT..UNLESS



1. You know it works (see chart)
2. Exigent circumstances- can't remove PCM to send it
3. Preliminary Assessment- not sure there is data yet
4. You have a plan to send it to Ford and use their official interpretation at trial if admissibility is in question

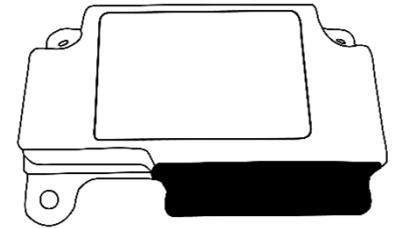
2FAHP71W47X000000 is a surrogate that works on all known Visteon/Motorola PCM's with 2K memory chip

Ford Bosch PCM's:

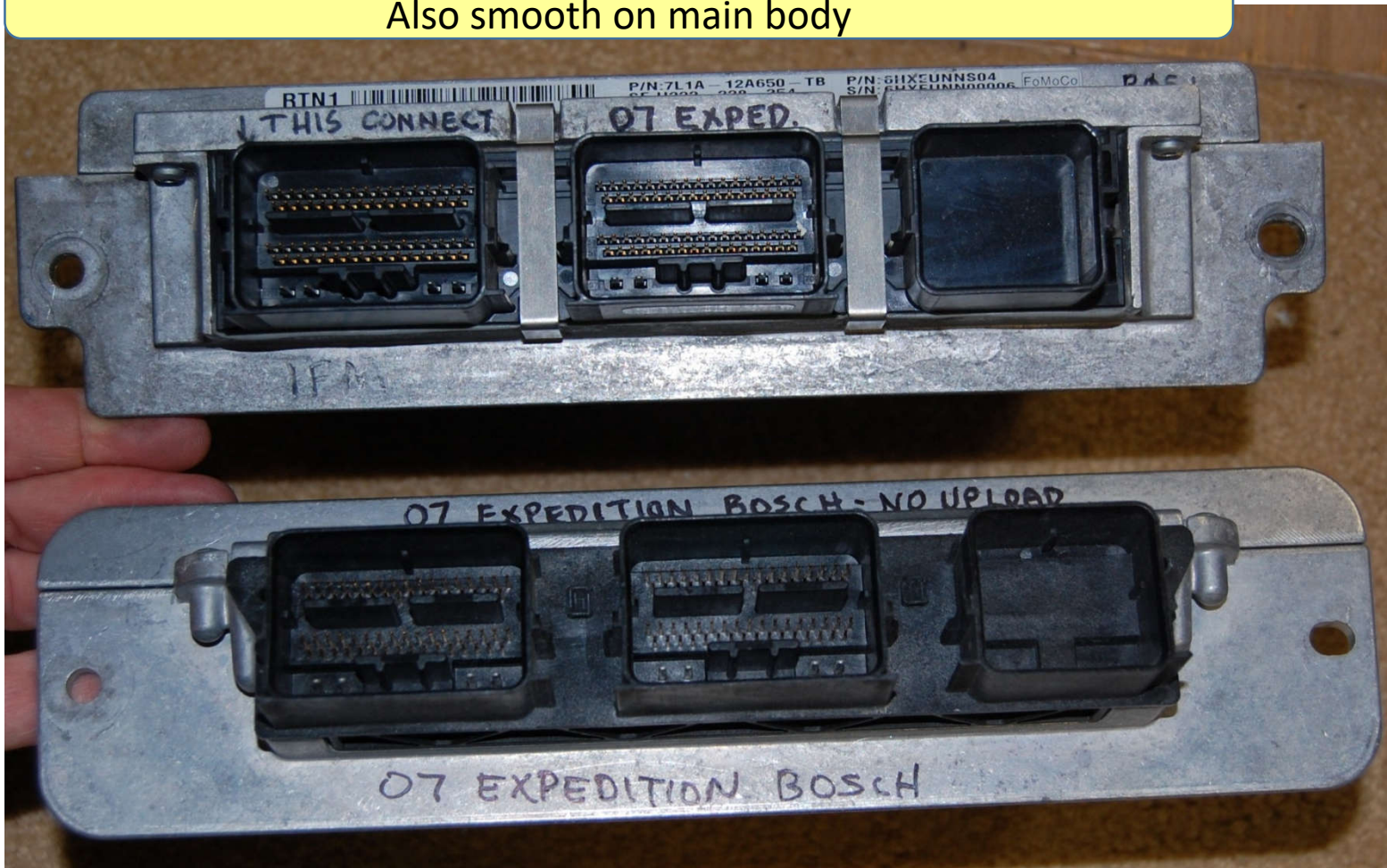


- Ford changed suppliers in mid 2007 for the Expedition and Navigator From Visteon/Motorola to Bosch
- You cannot spoof a Bosch PCM, you MUST send it to Ford
- Bosch PCM's have 4K memory (50 seconds of data)

Identifying a Bosch PCM on an Expedition

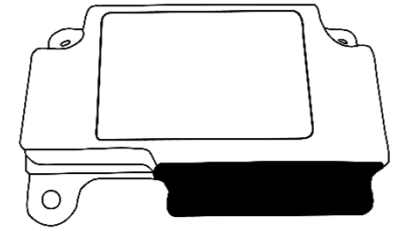


07 Visteon PCM – Notched Corners - Supported
Also smooth on main body



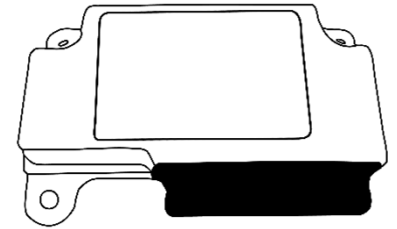
BOSCH –
Round
Corners
Also
waffle
pattern on
main body

2008+ Focus PCM



- Uses a different type of PCM
- Must be sent to Ford
- PCM Memory Chip out when Bosch AB10 RCM comes in (2012 MY)

2005-2008 Escape Hybrid PCM



- Has PCM Memory Chip (Gas Engine Escapes Don't)
- Output is SIMILAR but not same as non-hybrids
- Data elements for electric motor displace gas engine ones
- Must send to Ford to get read & interpreted properly
- CDR will read RAW data file with surrogate VIN, but some data will NOT be interpreted correctly (some will).
- Slightly different secret decoder ring!

Questions?

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