2014 XV Crosstrek Hybrid - Interview / Diagnostic Check Sheet

TO: SDC EST CEN WST

FROM: Subaru of America, Inc.

DEPARTMENT: Service

DATE: 12/18/2013

CATEGORY: Parts/Service

The release of the 2014 XV Crosstrek Hybrid brings with it a great deal of new technology and innovation. Chief among these are Start/ Stop and EV Mode drive operations. These modes of driving are new to our customers and as a result will undoubtedly prompt some questions on the Service Drive.

In order for technicians and SOA to better understand these inquiries and customer comments, FHI has created a Hybrid specific **Interview / Diagnostic Check Sheet**. This three page form combines a customer interview form that the Service Advisor can use to gather the full details of any customer concern, a diagnostic check sheet for the Technician to use to document their findings, and an appendix of reference information for the Technician to refer to during this diagnosis. This useful tool is found **on Subarunet under Service >> Forms**.

We highly encourage and strongly request the completion of this form anytime a customer presents with a concern related to Hybrid System operation. Subaru Service Managers and Directors are requested to review this area with all Service Advisors and Technicians and implement appropriate processes to ensure its completion anytime a Hybrid owner presents with a concern or question regarding Hybrid drive functions.

XV Crosstrek HYBRID（Auto start-stop / EV mode）Check Sheet

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When a customer experienced difficulties in getting into idle stop (Auto start-stop) mode and/or EV mode, please obtain following information for FHI's investigation. Please fill out the sections with "X" corresponding to

dealer name —

personal name

Classified		No	Check point	Idle Stop	EV mode	Contents	Results
Ask customers	basic information	1	Situation	X	X	Date	date / / time : am/pm
						Drive route	From to
						Elapsed time and distance	min. miles
						Road conditions (Check all that apply)	□pavement □good □rough □gravel □straight □curve □seam □flat □dry □puddle □snow □wet
						Inclination	□ up □ down □flat / %
						Height above sea level	feet
						Weather	□fine □cloudy □rainy □foggy □snowy
						Temperature	Degrees F
					X	Vehicle speed	MPH
				X	X	Was 'READY' indicator ON?	□Yes □No □Unknown
						Did any warning light come on in MFD? Check all that apply or list if not shown.	□Hybrid system □Engine □AT temp □ABS □VDC □MFD display □Charge □Other □None □unknown Others;
	vehicle condition	2	Engine condition	X	X	Choose the engine warming up condition	□Cold (immediately after the start) □During the warm-up (with blue indicator on) □Fully warmed up
		3	High voltage battery	X	X	How many segments (bars) of SOC were displayed on MFD for high voltage battery?	From to out of 8 segments
		4	Electric load	X	X	Was A/C on?	□Yes □No □Unknown If Yes □auto(set temp degrees F) □defroster □manual（blower fan seg）
						Choose from the right electrical load. （operating conditions at the time of point out）	□power window □rear defogger □head lights □fog lamps □hazard □car audio □wipers □wiper deicer □seat heaters □power seat
						Was some power being used from from the power outlet (12V)?	□Yes □No If yes ( )
						Are there any other optional parts? ex) Navigation etc. including the aftermarket devices	□Yes □No If yes ( )
	customer's habit in operation	5	Accelerator pedal		X	Does the customer tend to operate accelerator abruptly and deeply (for quicker acceleration)?	□Yes □No □Unknown Most frequently used pedal angle during driving: - %
		6	Brake pedal	X	X	When applying brakes, does the customer tend to depress brake pedal intermittently (like pumping action)?	□Yes □No □Unknown
					X	To control speed of the vehicle, does the customer tend to apply brakes frequently (instead of engine brake)?	□Yes □No □Unknown
				X		When releasing the brake pedal from the complete stop, does the customer tend to step off the pedal abruptly?	□Yes □No □Unknown
				X	X	Any other findings on brakes operation	□Yes □No □Unknown ( )
		7	Select lever	X	X	Where was the position of the select lever of transmission?	□P□R □N □D □M (gear) □D-Temporary manual mode (gear)

Note** All of No.8～13 are displayed in 'hybrid power train control system' in SSM-III.
Descriptions in the bracket [ ] are the item names of SSM-III.
Please try to reproduce the reported symptom and take SSM data from HPCU, BECU and DMCU.
Please also refer to page3 Appendix for criteria of 'Auto Start Stop' and EV Mode operation for details.

Classified		No	Check point	Idle Stop	EV mode	Contents	Results
checked by the technician	Checking by SSM-III while the problem occurs	8	Brake pedal**	X	X	Brake Booster Pressure is not less than 63.83kPa. [Brake Booster Pressure1,2]	□Yes □No kPa
				X		When stopping, the value of the brake stroke sensor is not greater than 10.6% [main brake pedal stroke]	□Yes □No %
					X	When stopping, the value of main brake pedal stroke is greater than 11.8%. [main brake pedal stroke]	□Yes □No %
		9	Coolant temp**	X	X	The coolant temperature is less than 126 degrees Fahrenheit. [coolant temperature]	□Yes □No degrees F
		10	Battery power**	X	X	High Voltage Battery SOC is less than 40%. [High Voltage Battery SOC]	□Yes □No %
					X	High Voltage Battery SOC is more than 73%. [High Voltage Battery SOC]	□Yes □No %
		11	Restart battery condition**	X	X	12V Engine Restart Battery Voltage is less than 12.6V. [12V Engine Restart Battery Voltage]	□Yes □No Volts
						12V Engine Restart Battery Temperature is less than 14 or more than 172 degrees F [12V Engine Restart Battery Temperature]	□Yes □No degrees F
						HPCM check 40 and 41is greater than 10mΩ.	□Yes □No mΩ
						12V Engine Restart Battery SOC (Control) is less than 70%. [12V Engine Restart Battery SOC Control]	□Yes □No %
		12	ISG temp**	X	X	ISG temperature is over 212 degrees F. [ISG temperature]	□Yes □No degrees F
		13	DC/DC Converter status**	X	X	DCDC converter status is operative. [DCDC converter status]	□Yes □No (inactive)
	visual check	14	ISG condition	X	X	The ISG appearance is damaged.	□Yes □No □Unknown
						Is there any evidence of abnormal heat due to the belt slippage?	□Yes □No □Unknown

＜Appendix＞

Criteria for Auto start-stop / EV Mode Operation (ref. HEV diag-49)

Display	Auto start-stop		EV Mode		Note
	Condition for	Condition for cancel	Condition for	Condition for cancel	
Brake Booster Pressure 1 ［kPa］	< 63.83	> 69.83	< 63.83	> 69.83	Those values change depending on vehicle speed and/or atmospheric pressure. The reference value shown in upper row is expected when atmospheric pressure is 1 bar and vehicle speed is 0 km/h (0 MPH). The value shown in lower row is expected when atmospheric pressure is 1 bar and vehicle speed is 50 km/h (31.1 MPH).
Brake Booster Pressure 2 ［kPa］	< 51.33	> 55.33	< 51.33	> 55.33	
12V Engine Restart Battery SOC Control[%]	≥ 70.0	< 60.0	≥ 70.0	< 60.0	When the level decreases below 60%, the operation does not recover until the level reaches at 70%. Once the level reaches at 70%, the operation continues until the level decreases less than 60%.
12V Engine Restart Battery Voltage[V]	≥ 12.6	≤ 11.4	≥ 12.6	≤ 11.4	—
12V Engine Restart Battery Temperature[℃]	≥ −10 (14°F) and ≤ 78 (172.4°F)	< −12 (10.4°F) or ≥ 80 (176°F)	≥ −10 (14°F) and ≤ 78 (172.4°F)	< −12 (10.4°F) or ≥ 80 (176°F)	—
HPCM Check 40[mΩ]	< 10	≥ 15	< 10	≥ 15	—
HPCM Check 41[mΩ]	< 10	≥ 15	< 10	≥ 15	—
Coolant Temperature[℃]	≥ 60 (140.0°F)	≤ 57 (134.6°F)	≥ 60 (140.0°F)	≤ 57 (134.6°F)	—
D Range	ON	OFF	ON	OFF	• The Auto start-stop is only activated in D-range, whereas it continues operating even shifted in P, R or N range. • The EV mode is only activated in D-range, whereas it continues operating in EV mode even shifted in R range. • Also, EV mode may continue when shifter is moved through N range or P range transitionally.
High Voltage Battery SOC[%]	≥ 40.0	≤ 38.5	≥ 43.0 and < 73.0	≤ 40.0 or > 76.0	—
ISG Temperature[℃]	< 100	≥ 140	< 100	≥ 140	The Auto start-stop is canceled when temperature reaches 140°C (284°F) and not recovered until the temperature decreases to less than 100°C (212°F). Once the temperature decreases to less than 100°C (212°F), the operation continues until the temperature reaches at 140°C (284°F).
Vehicle Speed (Control) [km/h]	≤ 0.1	> 8	—	—	—
HPCM Check 76 [%]	≤|0～±8|	>|±8 |	< 5～20	≥15～100	—
Accelerator opening angle[%]	≤ 0.5	≥ 0.7	—	> 19.9	—
Main Brake Pedal Stroke[%]	≥ 10.6	≤ 9.0	< 11.8 ～ 23.5	≥ 11.8 ～ 23.5	The threshold values for both permitting and canceling EV mode are always equal but changes depends on the vehicle speed.
DCDC Converter Status	ON	Inactive	ON	Inactive	—