

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	168	3	Electrical Potential (Voltage) - Voltage above normal, or shorted to high source	-	-	-	Battery over voltage	none	The system voltage is too high	Check the system voltage	ECU is awake	> 16 V
33	168	4	Electrical Potential (Voltage) - Voltage below normal, or shorted to low source	-	-	-	Battery under voltage	none	The system voltage is too low	Check the system voltage	ECU is awake	< 9.0 V
33	520201	4	Fuse group 25 - Voltage below normal, or shorted to low source	conn X2, pin 14 conn X1, pin 4 conn X1, pin 1	F25	R8	Common DTC for pins 783 (transmission oil temperature gauge, IGN), 636 (collision avoidance system, IGN) and 3027 (hands free phone, IGN). Short to ground can be also active in case of stuck relay.	Connected loads are always off	1. The wiring harness to the connected loads is shorted to ground 2. Fuse 25 is blown 3. The relay which supplies Fuse group 25 is stuck	1. Check the wiring harness to the connected loads 2. Check fuse 25 3. Check the relay which supplies Fuse group 25	1. Battery voltage is greater than 9V and smaller than 16V 2. IGN_1 mode pin group is active	blown fuse / removed fuse

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33	520203	4	Fuse group 2 - Voltage below normal, or shorted to low source	conn X1, pin 3 conn X1, pin 6 conn X1, pin 9	F2	-	Common DTC for pins 161 (cabin HVAC controller, BAT), 167 (sleeper HVAC controller, BAT) and 3062 (transmission shift control panel, BAT).	Connected loads are always off	1. The wiring harness to the connected loads is shorted to ground 2. Fuse 2 is blown	1. Check the wiring harness to the connected loads 2. Check fuse 2	Battery voltage is greater than 9V and smaller than 16V	blown fuse / removed fuse
33	520210	3	Cabin HVAC controller, ACC - Voltage above normal, or shorted to high source	conn X1, pin 10	-	-	Pin 164	Connected load is always supplied	1. The wiring harness to connected load is shorted to battery 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. Battery voltage is greater than 9V and smaller than 16V 2. Cabin HVAC controller, ACC is inactive.	> 4.1 V
33	520210	4	Cabin HVAC controller, ACC - Voltage below normal, or shorted to low source	conn X1, pin 10	-	-	Pin 164, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	Cabin HVAC controller, ACC is active.	> 1.5 A

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33	520215	3	Sleeper HVAC controller, ACC - Voltage above normal, or shorted to high source	conn X1, pin 15	-	-	Pin 163	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_cab_config_day_sleeper' is set to "sleeper" 2. Battery voltage is greater than 9V and smaller than 16V 3. Sleeper HVAC controller, ACC is inactive.	> 4.1 V
33	520215	4	Sleeper HVAC controller, ACC - Voltage below normal, or shorted to low source	conn X1, pin 15	-	-	Pin 163, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_cab_config_day_sleeper' is set to "sleeper" 2. Sleeper HVAC controller, ACC is active.	> 1.5 A
33	520304	3	VCU/CPC, IGN - Voltage above normal, or shorted to high source	conn X2, pin 4	-	-	Pin 371	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. Battery voltage is greater than 9V and smaller than 16V 2. IGN_1 normal mode pin group is inactive	> 4.1 V

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33	520304	4	VCU/CPC, IGN - Voltage below normal, or shorted to low source	conn X2, pin 4	-	-	Pin 371, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	IGN_1 normal mode pin group is active	> 1.5 A
33	520403	31	Bistable relay BR25 - Implausible output state	conn X1, pin 13 conn X3, pin 3 conn X14, pin 1 conn X16, pin 13	F17 F31 F36	BR25	DTC for pins 575 (12V power receptacle 4 (sleeper, cigar), BAT, X3/3), 576 (12V power receptacle 5 (sleeper, cigar), BAT, X14/1), 176 (auxillary circulation fan - sleeper, BAT, X1/13) and 553 (reading lamp 4 (switched locally), BAT, X16/13). Automatic retry	Connected loads are always supplied in case of short to battery or if the bistable relay contacts are stuck in "on" position. Connected loads are always off, if the bistable relay contacts are stuck in "off" position.	1. The wiring harness to the connected loads is shorted to battery 2. Bistable relay 25 is stuck	1. Check the wiring harness to the connected loads 2. Check Bistable relay 25	The SAM cabin parameter 'par_Bistable_Relay_25_fault_reporting' is set to "present"	> 6 V for bistable relay in "off" state OR < 2 V for bistable relay in "on" state

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	520404	3	Advertising light, ACC - Voltage above normal, or shorted to high source	conn X3, pin 4	-	-	Pin 391	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. SAM cabin ECU model is set to "highline" 2. Battery voltage is greater than 9V and smaller than 16V 3. ACC_2 optimized mode pin group is inactive	> 8 V
33	520404	4	Advertising light, ACC - Voltage below normal, or shorted to low source	conn X3, pin 4	-	-	Pin 391, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. SAM cabin ECU model is set to "highline" 2. ACC_2 optimized mode pin group is active	> 13.7 A

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	520406	4	SRS airbag, IGN - Voltage below normal, or shorted to low source	conn X3, pin 6	F26	R8	Pin 639, Short to ground can be also active in case of stuck relay.	Connected load is always off	1. The wiring harness to the connected load is shorted to ground 2. Fuse is blown 3. Relay is stuck	1. Check the wiring harness to the connecte d load 2. Check fuse 3. Check relay	1. SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_SRS_ai rbag_modul e' is set to "present" 3. Battery voltage is greater than 9V and smaller than 16V 4. IGN_1 normal mode pin group is active	blown fuse / removed fuse

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	520407	5	Utility light Current below normal, or open circuit	conn X3, pin 7	-	-	Pin 510	No load is connected	1. The wiring harness to the connected load is open 2. The connected load is not functionin g properly	1. Check the wiring harness to the connecte d load 2. Check load	1. The SAM cabin parameter 'par_utility_l amp' is set to "present" 2. The SAM cabin parameter 'par_utility_l amp_fault_r eorting' contains "Open Load" 3. Battery voltage is greater than 9V and smaller than 16V 4. Utility Light transition from active to inactive	< 0.01 A

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	520407	3	Utility light Voltage above normal, or shorted to high source	conn X3, pin 7	-	-	Pin 510	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_utility_l amp' is set to "present" 2. The SAM cabin parameter 'par_utility_l amp_fault_reporting' contains "Short to BAT" 3. Battery voltage is greater than 9V and smaller than 16V 4. Utility Light is inactive	> 8 V
33	520407	4	Utility light Voltage below normal, or shorted to low source	conn X3, pin 7	-	-	Pin 510, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	The wiring harness to the connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_utility_l amp' is set to "present" 2. The SAM cabin parameter 'par_utility_l amp_fault_reporting' contains "Short to GND" 3. Utility Light is active	> 26 A

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	520415	31	Bistable relay BR22 - Implausible output state	conn X3, pin 15 conn X5, pin 1 conn X5, pin 2	F3 F15	BR22	DTC for pins 574 (12V power receptacle 3 (sleeper, cigar), BAT, X3/15), 96 (power feed spare output II, BAT, X5/1) and 101 (power feed spare output IV, BAT, X5/2). Automatic retry mechanism (5 retries, with a minimum delay of 100ms between retries). DTC will	Connected loads are always supplied in case of short to battery or if the bistable relay contacts are stuck in "on" position. Connected loads are always off, if the bistable relay contacts are stuck in "off" position.	1. The wiring harness to the connected loads is shorted to battery 2. Bistable relay 22 is stuck	1. Check the wiring harness to the connected loads 2. Check Bistable relay 22	The SAM cabin parameter 'par_Bistable_Relay_22_fault_reporting' is set to "present"	> 6 V for bistable relay in "off" state OR < 2 V for bistable relay in "on" state

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	520702	4	Fuse group 14 - Voltage below normal, or shorted to low source	conn X6, pin 2 conn X6, pin 3	F14	BR23	Common DTC for pins 712 (fleet management system, BAT, X6/2) and 697 (CB radio, BAT, X6/3). Short to ground can be also active in case of stuck relay.	Connected loads are always off	1. The wiring harness to the connected loads is shorted to ground 2. Fuse 14 is blown 3. The relay which supplies Fuse group 14 is stuck	1. Check the wiring harness to the connected loads 2. Check fuse 14 3. Check the relay which supplies Fuse group 14	1. Battery voltage is greater than 9V and smaller than 16V 2. Fleet management system, BAT is active 3. PNM_Lvl_St at > 0	blown fuse / removed fuse

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	520709	31	Bistable relay BR23 - Implausible output state	conn X6, pin 2 conn X6, pin 3 conn X6, pin 9	F7 F14	BR23	DTC for pins 573 (12V power receptacle 2 (dash, phone), BAT, X6/9), 697 (CB radio, BAT, X6/3) and 712 (fleet management system, BAT, X6/2). Automatic retry mechanism (5 retries, with a minimum delay of 100ms between retries). DTC will be set when	Connected loads are always supplied in case of short to battery or if the bistable relay contacts are stuck in "on" position. Connected loads are always off, if the bistable relay contacts are stuck in "off" position.	1. The wiring harness to the connected loads is shorted to battery 2. Bistable relay 23 is stuck	1. Check the wiring harness to the connected loads 2. Check Bistable relay 23	The SAM cabin parameter 'par_Bistable_Relay_23_fault_report' is set to "present"	> 6 V for bistable relay in "off" state OR < 2 V for bistable relay in "on" state

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	520710	3	Fuse group 23 - Voltage above normal, or shorted to high source	conn X3, pin 10 conn X6, pin 5 conn X6, pin 6 conn X6, pin 8 conn X6, pin 10 conn X6, pin 11	F23	R7	DTC for pins 290 (power feed gauge axle temperature, IGN), 293 (power feed driver information system, IGN), 294 (power feed gauge engine oil temp, IGN), 306 (power feed gauge pyrometer, IGN), 2823 (fleet management system, IGN) and 299 (GPS, IGN).	Connected loads are always supplied	1. The wiring harness to the connected loads is shorted to battery 2. The relay which supplies Fuse group 23 is stuck	1. Check the wiring harness to the connected loads 2. Check the relay which supplies Fuse group 23	1. Battery voltage is greater than 9V and smaller than 16V 2. IGN_2 mode pin group is inactive	> 8 V

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	520710	4	Fuse group 23 - Voltage below normal, or shorted to low source	conn X3, pin 10 conn X6, pin 5 conn X6, pin 6 conn X6, pin 8 conn X6, pin 10 conn X6, pin 11	F23	R7	DTC for pins 290 (power feed gauge axle temperature, IGN), 293 (power feed driver information system, IGN), 294 (power feed gauge engine oil temp, IGN), 306 (power feed gauge pyrometer, IGN), 2823 (fleet management system, IGN) and 299 (GPS, IGN).	Connected loads are always off	1. The wiring harness to the connected loads is shorted to ground 2. Fuse 23 is blown 3. The relay which supplies Fuse group 23 is stuck	1. Check the wiring harness to the connected loads 2. Check fuse 23 3. Check the relay which supplies Fuse group 23	1. Battery voltage is greater than 9V and smaller than 16V 2. IGN_2 mode pin group is active	blown fuse / removed fuse

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	520715	31	Bistable relay BR21 - Implausible output state	conn X4, pin 1 conn X4, pin 2 conn X6, pin 15	F1 F6	BR21	DTC for pins 572 (12V power receptacle 1 (dash, cigar), BAT, X6/15), 93 (power feed spare output I, BAT, X4/1) and 99 (power feed spare output III, BAT, X4/2). Automatic retry mechanism (5 retries, with a minimum delay of 100ms between retries). DTC will be set	Connected loads are always supplied in case of short to battery or if the bistable relay contacts are stuck in "on" position. Connected loads are always off, if the bistable relay contacts are stuck in "off" position.	1. The wiring harness to the connected loads is shorted to battery 2. Bistable relay 21 is stuck	1. Check the wiring harness to the connected loads 2. Check Bistable relay 21	The SAM cabin parameter 'par_Bistable_Relay_21_fault_report' is set to "present"	> 6 V for bistable relay in "off" state OR < 2 V for bistable relay in "on" state

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	520716	4	Fuse group 24 - Voltage below normal, or shorted to low source	conn X6 pin 16 conn X2, pin 9	F24	R8	Common DTC for pins 302 (instrument cluster, IGN) and 566 (diagnostic connector, IGN). Short to ground can be also active in case of stuck relay.	Connected loads are always off	<ol style="list-style-type: none"> The wiring harness to the connected loads is shorted to ground Fuse 24 is blown The relay which supplies Fuse group 24 is stuck 	<ol style="list-style-type: none"> Check the wiring harness to the connected loads Check fuse 24 Check the relay which supplies Fuse group 24 	<ol style="list-style-type: none"> Battery voltage is greater than 9V and smaller than 16V IGN_1 normal mode pin group is active 	blown fuse / removed fuse

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	520716	3	Relay group 8 - Voltage above normal, or shorted to high source	conn X1, pin 1 conn X1, pin 4 conn X2, pin 9 conn X2, pin 14 conn X3, pin 6 conn X6, pin 16	F24, F25, F26 (new!)	R8	DTC for pins 302 (instrument cluster, IGN), 566 (diagnostics connector, IGN), 783 (transmission oil temperature gauge, IGN), 636 (collision avoidance system, IGN), 3027 (hands free phone, IGN) and 639 (SRS airbag, IGN). Short to battery can be also active in case of stuck	Connected loads are always supplied	1. The wiring harness to the connected loads is shorted to battery 2. Relay 8 is stuck	1. Check the wiring harness to the connected loads 2. Check Relay 8	1. Battery voltage is greater than 9V and smaller than 16V 2. IGN_1 normal mode pin group is inactive	> 8 V
33	520718	4	Instrument cluster, BAT - Voltage below normal, or shorted to low source	conn X6, pin 18	F22	-	Pin 300	Connected loads are always off	1. The wiring harness to the connected loads is shorted to ground 2. Fuse 22 is blown	1. Check the wiring harness to the connected loads 2. Check fuse 22	Battery voltage is greater than 9V and smaller than 16V	blown fuse / removed fuse

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	520804	4	Cabin HVAC fan motor, BAT - Voltage below normal, or shorted to low source	conn X7, pin 4	F10	-	Pin 165. If the HVAC blower is in Position 0 when the fuse is removed/broken, the fault will take up to 15 seconds to mature.	Connected loads are always off	1. The wiring harness to the connected loads is shorted to ground 2. Fuse 10 is blown	1. Check the wiring harness to the connected loads 2. Check fuse 10	Battery voltage is greater than 9V and smaller than 16V	blown fuse / removed fuse
33	520905	3	Door open status - Voltage above normal, or shorted to high source	conn X8, pin 5	-	-	Pin 2830	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. Battery voltage is greater than 9V and smaller than 16V 2. Door open status indicator is inactive	> 5.6 V
33	520905	4	Door open status - Voltage below normal, or shorted to low source	conn X8, pin 5	-	-	Pin 2830, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to the connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	Door open status indicator is active	> 2 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	520908	3	Mirror heating - Voltage above normal, or shorted to high source	conn X8, pin 8 conn X17, pin 2 conn X16, pin 10 (new!)	F27, F28, F41 (new!)	R10	Common DTC for pins 272 (mirror heating driver), 273 (mirror heating passenger) and 3146 (auxiliary mirror heating - mirror on hood). Short to battery can be also active in case of stuck relay.	Connected loads are always supplied	1. The wiring harness to the connected loads is shorted to battery 2. Relay is stuck	1. Check the wiring harness to the connected loads 2. Check relay	cabin parameter 'par_mirror_heating_exists' is set to "yes" 2. The SAM cabin parameter 'par_door_module_exists' is set to "not present" 3. The SAM cabin parameter 'par_mirror_heating_fault_reporting' contains "Short to BAT" 4. Battery voltage is greater than 9V and smaller than 16V 5. Mirror heating driver is	> 8 V

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	520908	4	Mirror heating driver - Voltage below normal, or shorted to low source	conn X8, pin 8	F27	R10	Pin 272, Short to ground can be also active in case of stuck relay.	Connected load is always off	1. The wiring harness to the connected load is shorted to ground 2. Fuse is blown 3. Relay is stuck	1. Check the wiring harness to the connected load 2. Check fuse 3. Check relay	cabin parameter 'par_mirror_heating_exists' is set to "yes" 2. The SAM cabin parameter 'par_door_module_exists' is set to "not present" 3. The SAM cabin parameter 'par_mirror_heating_fault_reporting' contains "Short to GND" 4. Battery voltage is greater than 9V and smaller than 16V 5. Mirror heating driver is	blown fuse / removed fuse

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	520909	3	Door sill lamp driver - Voltage above normal, or shorted to high source	conn X8, pin 9	-	-	Pin 403	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	<ol style="list-style-type: none"> 1. The SAM cabin parameter 'par_entry_lighting' is set to "present" 2. The SAM cabin parameter 'par_entry_lighting_activate_with_door' contains "Door sill lamps" 3. Battery voltage is greater than 9V and smaller than 16V 4. Door sill lamp driver (in door, to ground) is inactive 	> 4.1 V

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	520909	4	Door sill lamp driver - Voltage below normal, or shorted to low source	conn X8, pin 9	-	-	Pin 403, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	<p>1. The wiring harness to connected load is shorted to ground</p> <p>2. The connected load is not functioning properly</p>	<p>1. Check the wiring harness to the connected load</p> <p>2. Check load</p>	<p>1. The SAM cabin parameter 'par_entry_lighting' is set to "present"</p> <p>2. The SAM cabin parameter 'par_entry_lighting_activate_with_door' contains "Door sill lamps"</p> <p>3. Door sill lamp driver (in door, to ground) is active</p>	> 1.5 A

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521001	3	Body builder connector: RPM - Voltage above normal, or shorted to high source	conn X9, pin 1	-	-	Pin 61	Connected load is always supplied	1. The wiring harness to connected load is shorted to battery 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_BBC_engine_speed_signal_config' must be set different than "disabled" 3. Battery voltage greater than 9V and smaller than 16V 4. Body Builder connector, revolution (W) is off	> 8 V
33	521001	4	Body builder connector: RPM - Voltage below normal, or shorted to low source	conn X9, pin 1	-	-	Pin 61, activation of pin when engine rpm changes from 0 rpm to greater than 300 rpm	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_BBC_engine_speed_signal_config' must be set different than "disabled" 3. Body Builder connector, revolution (W) is on	> 2.5 A

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33	521002	3	Body builder connector: vehicle speed - Voltage above normal, or shorted to high source	conn X9, pin 2	-	-	Pin 65	Connected load is always supplied	<p>1. The wiring harness to connected load is shorted to battery</p> <p>2. The connected load is not functioning properly</p>	<p>1. Check the wiring harness to the connected load</p> <p>2. Check load</p>	<p>1. SAM cabin ECU model is set to "highline"</p> <p>2. The SAM cabin parameter 'par_BBC_vehicle_speed_signal_config' must be set different than "disabled"</p> <p>3. Battery voltage greater than 9V and smaller than 16V</p> <p>4. Body Builder connector, vehicle speed (C3) is off</p>	> 8 V

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SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521002	4	Body builder connector: vehicle speed - Voltage below normal, or shorted to low source	conn X9, pin 2	-	-	Pin 65, activation of pin when vehicle speed changes from 0 miles/h to greater than 3 miles/h or 3.6 km/h	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_BBC_vehicle_speed_signal_config' must be set different than "disabled" 3. Body Builder connector, vehicle speed (C3) is on	> 2.5 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521003	3	Function pin 1 - Voltage above normal, or shorted to high source	conn X9, pin 3	-	-	Pin 73	Connected load is always supplied	The wiring harness to connected load is shorted to battery	Check the wiring harness to connected load	1. The SAM cabin parameter 'par_Spare function pin 1 (Output pin)' is set to "yes" 2. The SAM cabin parameter 'par_spare_function_pin_1_fault_reporting' contains "Short to BAT" 3. Battery voltage greater than 9V and smaller than 16V 4. Function pin 1 is inactive	> 5.6 V
33	521003	4	Function pin 1 - Voltage below normal, or shorted to low source	conn X9, pin 3	-	-	Pin 73, Automatic retry mechanism (3 retries, one after every 1s)	Connected load is always off	The wiring harness to connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_Spare function pin 1 (Output pin)' is set to "yes" 2. The SAM cabin parameter 'par_spare_function_pin_1_fault_reporting' contains "Short to GND" 3. Function pin 1 is active	> 2 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521004	3	Body builder connector: park brake - Voltage above normal, or shorted to high source	conn X9, pin 4	-	-	Pin 60	Connected load is always supplied	1. The wiring harness to connected load is shorted to battery 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin ECU model is set to "highline" 2. Battery voltage greater than 9V and smaller than 16V 3. Body Builder connector park brake is inactive	> 5.6 V
33	521004	4	Body builder connector: park brake - Voltage below normal, or shorted to low source	conn X9, pin 4	-	-	Pin 60, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin ECU model is set to "highline" 2. Body Builder connector park brake is active	> 2 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521005	3	Function pin 2 - Voltage above normal, or shorted to high source	conn X9, pin 5	-	-	Pin 74	Connected load is always supplied	The wiring harness to connected load is shorted to battery	Check the wiring harness to connected load	1. The SAM cabin parameter "par_Spare function pin 2 (Output pin)" is set to "yes" 2. The SAM cabin parameter 'par_spare_function_pin_2_fault_reporting' contains "Short to BAT" 3. Battery voltage greater than 9V and smaller than 16V 4. Function pin 2 is inactive	> 5.6 V
33	521005	4	Function pin 2 - Voltage below normal, or shorted to low source	conn X9, pin 5	-	-	Pin 74, Automatic retry mechanism (3 retries, one after every 1s)	Connected load is always off	The wiring harness to connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM cabin parameter "par_Spare function pin 2 (Output pin)" is set to "yes" 2. The SAM cabin parameter 'par_spare_function_pin_2_fault_reporting' contains "Short to GND" 3. Function pin 2 is active	> 2 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521006	3	Function pin 4 - Voltage above normal, or shorted to high source	conn X9, pin 6	-	-	Pin 2871	Connected load is always supplied	The wiring harness to connected load is shorted to battery	Check the wiring harness to connected load	1. The SAM cabin parameter "par_Spare function pin 4 (Output pin)" is set to "yes" 2. The SAM cabin parameter 'par_spare_function_pin_4_fault_reporting' contains "Short to BAT" 3. Battery voltage greater than 9V and smaller than 16V 4. Function pin 4 is inactive	> 5.6 V
33	521006	4	Function pin 4 - Voltage below normal, or shorted to low source	conn X9, pin 6	-	-	Pin 2871, Automatic retry mechanism (3 retries, one after every 1s)	Connected load is always off	The wiring harness to connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM cabin parameter "par_Spare function pin 4 (Output pin)" is set to "yes" 2. The SAM cabin parameter 'par_spare_function_pin_4_fault_reporting' contains "Short to GND" 3. Function pin 4 is active	> 2 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521007	3	Function pin 3 - Voltage above normal, or shorted to high source	conn X9, pin 7	-	-	Pin 75	Connected load is always supplied	The wiring harness to connected load is shorted to battery	Check the wiring harness to connected load	1. The SAM cabin parameter "par_Spare function pin 3 (Output pin)" is set to "yes" 2. The SAM cabin parameter 'par_spare_function_pin_3_fault_reporting' contains "Short to BAT" 3. Battery voltage greater than 9V and smaller than 16V 4. Function pin 3 is inactive	> 5.6 V
33	521007	4	Function pin 3 - Voltage below normal, or shorted to low source	conn X9, pin 7	-	-	Pin 75, Automatic retry mechanism (3 retries, one after every 1s)	Connected load is always off	The wiring harness to connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM cabin parameter "par_Spare function pin 3 (Output pin)" is set to "yes" 2. The SAM cabin parameter 'par_spare_function_pin_3_fault_reporting' contains "Short to GND" 3. Function pin 3 is active	> 2 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521009	3	Body builder connector: backup light - Voltage above normal, or shorted to high source	conn X9, pin 9	-	-	Pin 54, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to battery 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_BBC_backup_lamp_fault_reporting' contains "Short to BAT" 3. Body Builder connector backup lamp is active	> 2 A
33	521010	3	Body builder connector: marker lights - Voltage above normal, or shorted to high source	conn X9, pin 10	-	-	Pin 52, Automatic retry mechanism (5 retries, one after every 5s)	Connected loads are always off	1. The wiring harness to connected loads is shorted to battery 2. The connected loads are not functioning properly	1. Check the wiring harness to the connected loads 2. Check loads	1. The SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_BBC_marker_lamps_fault_reporting' contains "Short to BAT" 3. Body Builder connector marker lights are active	> 2 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521011	3	Body builder connector: IGN_X - Voltage above normal, or shorted to high source	conn X9, pin 11	-	-	Pin 57, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to battery 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. SAM cabin ECU model is set to "highline" 2. Body Builder connector IGN is active.	> 2 A
33	521012	3	Body builder connector: tail lights - Voltage above normal, or shorted to high source	conn X9, pin 12	-	-	Pin 64, Automatic retry mechanism (5 retries, one after every 5s)	Connected loads are always off	1. The wiring harness to connected loads is shorted to battery 2. The connected loads are not functioning properly	1. Check the wiring harness to the connected loads 2. Check loads	1. The SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_BBC_tail_lamps_fault_reporting' contains "Short to BAT" 3. Body Builder connector tail lights are active	> 2 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521013	3	Body builder connector: turn right - Voltage above normal, or shorted to high source	conn X9, pin 13	-	-	Pin 62. Automatic retry mechanism: 5 retries, one retry after every "rising edge" (in case of functional request via Turn or Hazard switch) OR one retry after every 5s (in case of output activation via IO Control)	Connected load is always off	1. The wiring harness to connected load is shorted to battery 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_BBC_turn_lamps_fault_reporting' contains "Short to BAT" 3. Body Builder connector right turn is active	> 2 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521014	3	Body builder connector: turn left - Voltage above normal, or shorted to high source	conn X9, pin 14	-	-	Pin 59. Automatic retry mechanism: 5 retries, one retry after every "rising edge" (in case of functional request via Turn or Hazard switch) OR one retry after every 5s (in case of output activation via IO Control)	Connected load is always off	1. The wiring harness to connected load is shorted to battery 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_BBC_turn_lamps_fault_reporting' contains "Short to BAT" 3. Body Builder connector left turn is active	> 2 A
33	521015	3	Body builder connector: stop lights - Voltage above normal, or shorted to high source	conn X9, pin 15	-	-	Pin 63, Automatic retry mechanism (3 retries, one after every 1s)	Connected loads are always off	1. The wiring harness to connected loads is shorted to battery 2. The connected loads are not functioning properly	1. Check the wiring harness to the connected loads 2. Check loads	1. The SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_BBC_stop_lamps_fault_reporting' contains "Short to BAT" 3. Body Builder connector stop lights active	> 2 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521101	3	Tire pressure monitoring, IGN - Voltage above normal, or shorted to high source	conn X10, pin 1	-	-	Pin 2825	Connected load is always supplied	1. The wiring harness to the connected load is shorted to battery 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. SAM cabin ECU model is set to "highline" 2. Battery voltage is greater than 9V and smaller than 16V 3. Tire pressure monitoring, IGN is inactive	> 5.6 V
33	521101	4	Tire pressure monitoring, IGN - Voltage below normal, or shorted to low source	conn X10, pin 1	-	-	Pin 2825, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to the connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. SAM cabin ECU model is set to "highline" 2. Tire pressure monitoring, IGN is active	> 2 A
33	521102	4	Mirror adjust switch supply, ACC - Voltage below normal, or shorted to low source	conn X10, pin 2	-	-	Pin 173, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to the connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	Mirror Adjust Switch Supply, ACC is active	> 2 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521107	3	Service brake pressure switch - Voltage above normal, or shorted to high source	conn X13, pin 12 conn X10, pin 7	-	-	Common DTC for pins 152 (service brake pressure switch, BAT) and 2831 (servi ce brake pressure switch, feedback). CAN message Service Brake Status changes to "ERROR". Due to the nature of this failure, a short mature time is required.	Switch status is not known. Stop lamps are activated due to failsafe reaction	1. The wiring harness to the connected load is shorted to battery 2. The connected load is not functionin g properly	1. Check the wiring harness to the connecte d load 2. Check load	1. SAM cabin is active (e.g. ignition is on) 2. Battery voltage is greater than 9V and smaller than 16V	< 100 Ohm

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521107	4	Service brake pressure switch - Voltage below normal, or shorted to low source	conn X13, pin 12 conn X10, pin 7	-	-	Common DTC for pins 152 (service brake pressure switch, BAT) and 2831 (service brake pressure switch, feedback), CAN message Service Brake Status changes to "ERROR"	Switch status is not known. Stop lamps are activated due to failsafe reaction.	1. The wiring harness to the connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. SAM cabin is active (e.g. ignition is on) 2. Battery voltage is greater than 9V and smaller than 16V	< 30 Ohm
33	521110	3	Ignition group 1 - Voltage above normal, or shorted to high source	conn X20, pin 13 conn X10, pin 10	-	-	Common DTC for pins 314 (temperature sensor outside air gauge, IGN) and 179 (power feed sleeper thermostat, IGN)	Connected loads are always supplied	The wiring harness to the connected loads is shorted to battery	Check the wiring harness to the connected loads	1. Battery voltage is greater than 9V and smaller than 16V 2. IGN_1 normal mode pin group is inactive	> 4.1 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521110	4	Ignition group 1 - Voltage below normal, or shorted to low source	conn X10, pin 10 conn X20, pin 13	-	-	Common DTC for pins 314 (temperature sensor outside air gauge, IGN, X20/13) and 179 (power feed sleeper thermostat, IGN, X10/10). Automatic retry mechanism (5 retries, one after every 5s)	Connected loads are always off	1. The wiring harness to connected loads is shorted to ground 2. The connected loads are not functioning properly	1. Check the wiring harness to the connected loads 2. Check loads	IGN_1 normal mode pin group is active	> 1.1 A
33	521113	3	Panel lamps 12 volt - Voltage above normal, or shorted to high source	conn X10, pin 13	-	-	Pin 542	Connected loads are always supplied	The wiring harness to the connected loads is shorted to battery	Check the wiring harness to the connected loads	1. Battery voltage is greater than 9V and smaller than 16V 2. Panel lamps 12V are inactive	> 4.1 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521113	4	Panel lamps 12 volt - Voltage below normal, or shorted to low source	conn X10, pin 13	-	-	Pin 542, Automatic retry mechanism (5 retries, one after every 5s). The failure is not detected while the SAM Cabin is in software emergency mode.	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	Panel lamps 12V are active	> 10.8 A
33	521117	4	Wake-up (instrument cluster) - Voltage below normal, or shorted to low source	conn X10, pin 17	-	-	Pin 315, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	Wake-Up (Instrument Cluster) is active	> 2 A
33	521118	3	Radio, ACC - Voltage above normal, or shorted to high source	conn X10, pin 18	-	-	Pin 709	Connected load is always supplied	1. The wiring harness to connected load is shorted to battery 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. Battery voltage is greater than 9V and smaller than 16V 2. Radio, ACC is inactive	> 4.1 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521118	4	Radio, ACC - Voltage below normal, or shorted to low source	conn X10, pin 18	-	-	Pin 709, Automatic retry mechanis m (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functionin g properly	1. Check the wiring harness to the connecte d load 2. Check load	Radio, ACC is active	> 1.5 A
33	521120	5	Washer pump - Current below normal, or open circuit	conn X20, pin 20	-	-	Pin 794	No load is connected	1. The wiring harness to the connected load is open 2. The connected load is not functionin g properly	1. Check the wiring harness to the connecte d load 2. Check load	1. Battery voltage is greater than 9V and smaller than 16V 2. Washer Pump, Control transition from active to inactive	< 0.01 A
33	521120	3	Washer pump - Voltage above normal, or shorted to high source	conn X20, pin 20	-	-	Pin 794	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connecte d load	1. Battery voltage is greater than 9V and smaller than 16V 2. Washer Pump, Control is inactive	> 8 V
33	521120	4	Washer pump - Voltage below normal, or shorted to low source	conn X20, pin 20	-	-	Pin 794. The fault will not be set if applied during crank.	Connected load is always off	The wiring harness to connected load is shorted to ground	Check the wiring harness to the connecte d load	Washer Pump, Control is active	> 13.5 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521202	3	Washer level, ICU indicator - Voltage above normal, or shorted to high source	conn X11, pin 2	-	-	Pin 791, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to battery 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	Washer level, ICU indicator is active	> 2 A
33	521204	3	Fuel water separator ICU indicator - Voltage above normal, or shorted to high source	conn X11, pin 4	-	-	Pin 2861, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to battery 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin ECU model is set to "highline" 2. Fuel water separator ICU indicator is active	> 2 A
33	521206	3	Low air pressure ICU indicator - Voltage above normal, or shorted to high source	conn X11, pin 6	-	-	Pin 2824, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to battery 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_primary_low_air_pressure_switch' is set to "present" 2. Low Air Pressure ICU Indicator is inactive	> 2 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521207	3	LVD Chime / Light ON Buzzer - Voltage above normal, or shorted to high source	conn X11, pin 7	-	-	Pin 452 , Automatic retry mechanis m (5 retries, one after every "rising edge")	Connected load is always off	1. The wiring harness to connected load is shorted to battery 2. The connected load is not functionin g properly	1. Check the wiring harness to the connecte d load 2. Check load	1. The SAM cabin parameter 'par_PNM_v ariant' is set to "LVD" 2. Lights ON buzzer is active	> 2 A
33	521208	3	Engine brakes retarder enable ICU indicator - Voltage above normal, or shorted to high source	conn X11, pin 8	-	-	Pin 2859, Automatic retry mechanis m (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to battery 2. The connected load is not functionin g properly	1. Check the wiring harness to the connecte d load 2. Check load	Engine brakes retarder enable ICU indicator is active	> 2 A
33	521209	4	High beam ICU indicator - Voltage below normal, or shorted to low source	conn X11, pin 9	-	-	Pin 2800, Automatic retry mechanis m (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functionin g properly	1. Check the wiring harness to the connecte d load 2. Check load	High beam ICU indicator is active	> 2 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521211	3	Turn left ICU indicator - Voltage above normal, or shorted to high source	conn X11, pin 11	-	-	Pin 554	Connected load is always supplied.	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connecte d load	1. Battery voltage is greater than 9V and smaller than 16V 2. Turn signal left ICU indicator is inactive	> 5.6 V
33	521211	4	Turn left ICU indicator - Voltage below normal, or shorted to low source	conn X11, pin 11	-	-	Pin 554. Automatic retry mechanis m: 5 retries, one retry after every "rising edge" (in case of functional request via Turn or Hazard switch) OR one retry after every 5s (in case of output activation via IO Control)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functionin g properly	1. Check the wiring harness to the connecte d load 2. Check load	Turn signal left ICU indicator is active	> 2 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521212	3	Alternator no charge ICU indicator - Voltage above normal, or shorted to high source	conn X11, pin 12	-	-	Pin 2860, Automatic retry mechanis m (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to battery 2. The connected load is not functionin g properly	1. Check the wiring harness to the connecte d load 2. Check load	1. The SAM cabin parameter 'par_alternat or_charging _input_conf ig' is set to "enable" 2. Alternator No Charge ICU indicator is active	> 2 A
33	521213	3	Turn right ICU indicator - Voltage above normal, or shorted to high source	conn X11, pin 13	-	-	Pin 555	Connected load is always supplied.	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connecte d load	1. Battery voltage is greater than 9V and smaller than 16V 2. Turn signal right ICU indicator is inactive	> 5.6 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521213	4	Turn right ICU indicator - Voltage below normal, or shorted to low source	conn X11, pin 13	-	-	Pin 555. Automatic retry mechanis m: 5 retries, one retry after every "rising edge" (in case of functional request via Turn or Hazard switch) OR one retry after every 5s (in case of output activation via IO Control)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functionin g properly	1. Check the wiring harness to the connecte d load 2. Check load	Turn signal right ICU indicator is active	> 2 A
33	521214	3	Park brake ICU indicator - Voltage above normal, or shorted to high source	conn X11, pin 14	-	-	Pin 2829, Automatic retry mechanis m (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to battery 2. The connected load is not functionin g properly	1. Check the wiring harness to the connecte d load 2. Check load	Park Brake ICU indicator is active	> 2 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521220	2	Top and bottom of clutch switch - Data erratic, intermittent or incorrect	conn X11, pin 20 conn X11, pin 17	-	-	Common DTC for pins 183 (bottom of clutch) and 186 (top of clutch). CAN messages "Clutch switch top request" and "Clutch switch bottom request" change to "ERROR".	Clutch switch status does not reflect the status of the clutch pedal	1. The Top of Clutch switch and/or Bottom of Clutch switch are stuck. 2. The wiring harness to Top of Clutch switch and Bottom of Clutch switch is shorted to ground, shorted to battery or open	1. Check the clutch switches to Top of Clutch switch and Bottom of Clutch switch 2. Check the wiring harness to Top of Clutch switch and Bottom of Clutch switch	1. The SAM cabin parameter 'par_clutch_controlled_by_SAM' is set to "yes" 2. Battery voltage is greater than 9V and smaller than 16V 3. Bottom and Top of Clutch are active at once	switch top of clutch closed and bottom of clutch closed
33	521220	3	Top and bottom of clutch switch - Voltage above normal, or shorted to high source	conn X11, pin 20 conn X11, pin 17	-	-	Common DTC for pins 183 (bottom of clutch) and 186 (top of clutch). Due to the nature of this failure, a short mature time is required.	Clutch switch status does not reflect the status of the clutch pedal	The wiring harness to Top of Clutch switch and/or Bottom of Clutch switch is shorted to battery	Check the wiring harness to Top of Clutch switch and Bottom of Clutch switch	1. The SAM cabin parameter 'par_clutch_controlled_by_SAM' is set to "yes" 2. Battery voltage is greater than 9V and smaller than 16V	> 7 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521303	3	Footwell lamp - Voltage above normal, or shorted to high source	conn X12, pin 3	-	-	Pin 539	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_footwell_lighting' is set to "present" 2. Battery voltage is greater than 9V and smaller than 16V 3. Footwell lamp is inactive	> 4.1 V
33	521303	4	Footwell lamp - Voltage below normal, or shorted to low source	conn X12, pin 3	-	-	Pin 539, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_footwell_lighting' is set to "present" 2. Footwell lamp is active	> 2.3 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521306	3	Reading lamp 1, zone 9 - Voltage above normal, or shorted to high source	conn X12, pin 6	-	-	Pin 550	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_cab_config_day_sleeper' is set to "sleeper" 2. Battery voltage is greater than 9V and smaller than 16V 3. Reading lamp 1 (dimnable/ heater) is inactive	> 4.1 V
33	521306	4	Reading lamp 1, zone 9 - Voltage below normal, or shorted to low source	conn X12, pin 6	-	-	Pin 550, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_cab_config_day_sleeper' is set to "sleeper" 2. Reading lamp 1 (dimnable/ heater) is active	> 3.3 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521307	3	Mid dome lamp - Voltage above normal, or shorted to high source	conn X12, pin 7	-	-	Pin 3141	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_mid_dome_lamp' is set to "present" 2. Battery voltage is greater than 9V and smaller than 16V 3. Mid dome lamp is inactive	> 4.1 V
33	521307	4	Mid dome lamp - Voltage below normal, or shorted to low source	conn X12, pin 7	-	-	Pin 3141, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_mid_dome_lamp' is set to "present" 2. Mid dome lamp is active	> 3.3 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521309	3	General sleeper lamp, zone 4b - Voltage above normal, or shorted to high source	conn X12, pin 9	-	-	Pin 530	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_general_sleeper_lighting' is set to "present" 2. Battery voltage is greater than 9V and smaller than 16V 3. General sleeper lamp is inactive	> 8 V
33	521309	4	General sleeper lamp, zone 4b - Voltage below normal, or shorted to low source	conn X12, pin 9	-	-	Pin 530, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_general_sleeper_lighting' is set to "present" 2. General sleeper lamp is active	> 8.0 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521312	3	Rear baggage compartment lights - Voltage above normal, or shorted to high source	conn X12, pin 12	-	-	Pin 525	Connected loads are always supplied	The wiring harness to the connected loads is shorted to battery	Check the wiring harness to the connected loads	1. The SAM cabin parameter 'par_rear_ba ggage_com partment_lig ht_control_t ype' is set to "ECU switched" 2. Battery voltage is greater than 9V and smaller than 16V 3. Rear baggage compartment lights are inactive	> 4.1 V
33	521312	4	Rear baggage compartment lights - Voltage below normal, or shorted to low source	conn X12, pin 12	-	-	Pin 525, Automatic retry mechanism (5 retries, one after every 5s)	Connected loads are always off	1. The wiring harness to connected loads is shorted to ground 2. The connected loads are not functionin g properly	1. Check the wiring harness to the connected loads 2. Check loads	1. The SAM cabin parameter 'par_rear_ba ggage_com partment_lig ht_control_t ype' is set to "ECU switched" 2. Rear baggage compartment lights are active	> 2.7 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521313	3	Sleeper footwell lamp - Voltage above normal, or shorted to high source	conn X12, pin 13	-	-	Pin 3142	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connecte d load	1. The SAM cabin parameter 'par_sleeper _footwell_la mp' is set to "present" 2. Battery voltage is greater than 9V and smaller than 16V 3. Sleeper footwell lamp is inactive	> 4.1 V
33	521313	4	Sleeper footwell lamp - Voltage below normal, or shorted to low source	conn X12, pin 13	-	-	Pin 3142, Automatic retry mechanis m (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functionin g properly	1. Check the wiring harness to the connecte d load 2. Check load	1. The SAM cabin parameter 'par_sleeper _footwell_la mp' is set to "present" 2. Sleeper footwell lamp is active	> 2.3 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521315	5	Turn left front side - Current below normal, or open circuit	conn X12, pin 15 conn X21, pin 11	-	-	(both X12/15 and X21/11), error detection depends on parameter. The Open Load failure detection on Turn left front side is inhibited if Marker lamp front left (pin-472, X18/14) is shorted to battery. The failure can be also dematured while the Turn left front side is active.	No load is connected Left turn signals are flashing at twice the normal frequency	1. The wiring harness to the connected load is open 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	cabin parameter 'par_turn_signal_side_fault_reporting' contains "Open Load" 2. Battery voltage is greater than 11.6V and smaller than 16V 3. Turn left front side is inactive 4. Switch park brake switch from engaged to disengaged or vice-versa or switch ignition switch from crank to ignition or switch the turn left front side from active to	> 50 kOhm

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521315	3	Turn left front side - Voltage above normal, or shorted to high source	conn X21, pin 11 conn X12, pin 15	-	-	Pin 501, error detection depends on parameter. Turn left front side shorted to battery inhibits the Open Load failure detection on Marker lamp front left (pin-472)	Connected load is always supplied. Left turn signals are flashing at twice the normal frequency	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_turn_signal_side_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Turn Left Front side is inactive	> 4.1 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521315	4	Turn left front side - Voltage below normal, or shorted to low source	conn X21, pin 11 conn X12, pin 15	-	-	Pin 501, error detection depends on parameter. Automatic retry mechanism: 5 retries, one retry after every "rising edge" (in case of functional request via Turn or Hazard switch) OR one retry after every 5s (in case of output activation via IO Control)	Connected load is always off. Left turn signals are flashing at twice the normal frequency	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_turn_signal_side_fault_reporting' contains "Short to GND" 2. Turn Left Front side is active	> 3.7 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521316	3	Reading lamp 2, zone 5 - Voltage above normal, or shorted to high source	conn X12, pin 16	-	-	Pin 551	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_cab_config_day_sleeper' is set to "sleeper" 2. Battery voltage is greater than 9V and smaller than 16V 3. Reading lamp 2 (dimnable/ heater) is inactive	> 4.1 V
33	521316	4	Reading lamp 2, zone 5 - Voltage below normal, or shorted to low source	conn X12, pin 16	-	-	Pin 551, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_cab_config_day_sleeper' is set to "sleeper" 2. Reading lamp 2 (dimnable/ heater) is active	> 2.6 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521317	3	Rear dome lamp, zone 4c - Voltage above normal, or shorted to high source	conn X12, pin 17	-	-	Pin 619	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_general_sleeper_lighting' is set to "present" 2. Battery voltage is greater than 9V and smaller than 16V 3. Dome lamp, rear is inactive	> 4.1 V
33	521317	4	Rear dome lamp, zone 4c - Voltage below normal, or shorted to low source	conn X12, pin 17	-	-	Pin 619, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_general_sleeper_lighting' is set to "present" 2. Dome lamp, rear is active	> 3.3 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521318	5	Turn right front side - Current below normal, or open circuit	conn X12, pin 18 conn X20, pin 15	-	-	(both X12/18 and X20/15), error detection depends on parameter. The Open Load failure detection on Turn right front side is inhibited if Marker lamp front right (pin-473, X18/12) is shorted to battery. The failure can be also dematured while the Turn right front side is active.	No load is connected Right turn signals are flashing at twice the normal frequency	1. The wiring harness to the connected load is open 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	cabin parameter 'par_turn_signal_side_fault_reporting' contains "Open Load" 2. Battery voltage is greater than 11.6V and smaller than 16V 3. Turn right front side inactive 4. Switch park brake switch from engaged to disengaged or vice-versa or switch ignition switch from crank to ignition or switch the turn right front side from active	> 50 kOhm

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521318	3	Turn right front side - Voltage above normal, or shorted to high source	conn X12, pin 18 conn X20, pin 15	-	-	Pin 506, error detection depends on parameter. Turn right front side shorted to battery inhibits the Open Load failure detection on Marker lamp front right (pin-473)	Connected load is always supplied. Right turn signals are flashing at twice the normal frequency	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_turn_signal_side_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Turn Right Front side is inactive	> 4.1 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521318	4	Turn right front side - Voltage below normal, or shorted to low source	conn X12, pin 18 conn X20, pin 15	-	-	Pin 506, error detection depends on parameter. Automatic retry mechanism: 5 retries, one retry after every "rising edge" (in case of functional request via Turn or Hazard switch) OR one retry after every 5s (in case of output activation via IO Control)	Connected load is always off. Right turn signals are flashing at twice the normal frequency	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_turn_signal_side_fault_reporting' contains "Short to GND" 2. Turn Right Front side is active	> 3.7 A
33	521402	3	CAN low - Voltage above normal, or shorted to high source	conn X13, pin 2	-	-	Pin 190	SAM is operating in Emergency Mode. Headlamps are active, clearance and marker lamps are flashing, turn signal ICU indicators are alternating due to failsafe behavior	The Cabin CAN Low wiring harness is shorted to battery	Check the Cabin CAN Low wiring harness for all Cabin CAN ECUs	1. Battery voltage is greater than 9V and smaller than 16V 2. CAN bus active (e.g. ignition is on)	> 4.8 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521403	4	CAN high - Voltage below normal, or shorted to low source	conn X13, pin 3	-	-	Pin 189	SAM is operating is Emergency Mode. Headlamps are active, clearance and marker lamps are flashing, turn signal ICU indicators are alternating due to failsafe behavior	The Cabin CAN High wiring harness is shorted to ground	Check the Cabin CAN High wiring harness for all Cabin CAN ECUs	1. Battery voltage is greater than 9V and smaller than 16V 2. CAN bus active (e.g. ignition is on)	> 250 mA

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521405	2	Ignition switch pins (ACC, Off, Ignition On, Crank) - Data erratic, intermittent or incorrect	conn X13, pin 15 conn X13, pin 6 conn X13, pin 5 conn X13, pin 4	-	-	DTC for pins 383 (ignition switch accessory), 384 (ignition switch - crank), 385 (ignition switch - off) and 386 (ignition switch - ignition on); this failure is required to violate the Crank sequence. If the failure is active the ECU will not allow the bus to power down. The	Ignition switch status reports ERROR	1. The wiring harness (ACC, IGN, CRANK) is shorted to battery or open 2. The ignition switch is not operating properly	1. Check the wiring harness (ACC, IGN, CRANK) 2. Check the ignition switch	Battery voltage is greater than 9V and smaller than 16V	> 6 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521407	6	Ignition switch, BAT - Current above normal, or grounded circuit	conn X13, pin 7	-	-	Pin 387	Erratic ignition switch behavior	1. The wiring harness (BAT, ACC, IGN, CRANK) is shorted to ground 2. The ignition switch is not operating properly 3. Additional loads are connected to the ignition switch	1. Check the wiring harness (BAT, ACC, IGN, CRANK) 2. Check the ignition switch	Battery voltage is greater than 9V and smaller than 16V	> 0.11 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521411	3	Chopped group 5 - Voltage above normal, or shorted to high source	conn X13 pin 8 conn X13, pin 9 conn X13, pin 10 conn X13, pin 11 conn X19, pin 13 conn X19, pin 14 conn X19, pin 15 (new!)	-	-	DTC for chopped pins 27 (low air pressure switch, input signal, X13/10), 30 (low air pressure switch, IGN, X13/11), 146 (park brake switch, input signal, X13/8), 147 (park brake switch, BAT, X13/9), 318 (air filter restriction sensor, IGN, X19/13), 319 (air	ICU indicators may not reflect switch status	The wiring harness to the connected loads is shorted to battery	Check the wiring harness to the connecte d loads	1. Battery voltage is greater than 9V and smaller than 16V 2. SAM cabin is active (e.g. ignition is on)	> 8 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521411	4	Chopped group 5 - Voltage below normal, or shorted to low source	conn X13, pin 9 conn X13, pin 11 conn X19, pin 13 conn X19, pin 14	-	-	DTC for chopped pins 30 (low air pressure switch, IGN, X13/11), 147 (park brake switch, BAT, X13/9), 318 (air filter restriction sensor, IGN, X19/13) and 328 (hood tilt switch signal, X19/14). Automatic retry mechanism (5 retries, one after every 5s). After the	ICU indicators may not reflect switch status	1. The wiring harness to the connected loads is shorted to ground 2. The connected loads are not functioning properly	1. Check the wiring harness to the connected loads 2. Check loads	SAM cabin is active (e.g. ignition is on)	> 2 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521502	4	12 V power receptacle 6 - Voltage below normal, or shorted to low source	conn X14, pin 2	F30	BR24	Pin 577, Short to ground can be also active in case of stuck relay.	Connected load is always off	1. The wiring harness to the connected load is shorted to ground 2. Fuse is blown 3. Relay is stuck	1. Check the wiring harness to the connecte d load 2. Check fuse 3. Check relay	1. The SAM cabin parameter 'par_power_ receptacle_ 6_fault_repo rting' contains "Short to GND" 2. Battery voltage is greater than 9V and smaller than 16V 3. 12V Power Receptacle 6 (sleeper, refrigerator) is active	blown fuse / removed fuse

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521502	31	Bistable relay BR24 - Implausible output state	conn X2, pin 15 conn X14, pin 2 conn X16, pin 7 conn X16, pin 17	F21 F30 F34 F35	BR24	DTC for pins 577 (12V power receptacle 6 (sleeper, refrigerator), BAT, X14/2), 517 (overhead compartment lights, BAT, X16/17), 527 (area lighting (lower bunk area and sleeper work surface), BAT, X2/15) and 529 (dome lamp cab, BAT, F16/7). Automatic retry	Connected loads are always supplied in case of short to battery or if the bistable relay contacts are stuck in "on" position. Connected loads are always off, if the bistable relay contacts are stuck in "off" position.	1. The wiring harness to the connected loads is shorted to battery 2. Bistable relay 24 is stuck	1. Check the wiring harness to the connected loads 2. Check Bistable relay 24	The SAM cabin parameter 'par_Bistable_Relay_24_fault_reporting' is set to "present"	> 6 V for bistable relay in "off" state OR < 2 V for bistable relay in "on" state
33	521702	3	Lane guidance, IGN - Voltage above normal, or shorted to high source	conn X16, pin 2	-	-	Pin 285	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. SAM cabin ECU model is set to "highline" 2. Battery voltage is greater than 9V and smaller than 16V 3. Lane guidance is inactive	> 8 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521702	4	Lane guidance, IGN - Voltage below normal, or shorted to low source	conn X16, pin 2	-	-	Pin 285, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. SAM cabin ECU model is set to "highline" 2. Lane guidance is active	> 14.2 A
33	521704	5	Clearance lamps II - Current below normal, or open circuit	conn X16, pin 4	-	-	Pin 396	No load is connected	1. The wiring harness to the connected load is open 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_clearance_II_lamp_fault_reporting' contains "Open Load" 2. Battery voltage is greater than 11.6V and smaller than 16V 3. Switch park brake switch from engaged to disengaged or vice-versa, or switch ignition switch from crank to ignition	> 50 kOhm

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521704	3	Clearance lamps II - Voltage above normal, or shorted to high source	conn X16, pin 4	-	-	Pin 396	Connected loads are always supplied	The wiring harness to the connected loads is shorted to battery	Check the wiring harness to the connected loads	1. The SAM cabin parameter 'par_clearance_II_lamp_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Clearance lamps II are inactive.	> 4.1 V
33	521704	4	Clearance lamps II - Voltage below normal, or shorted to low source	conn X16, pin 4	-	-	Pin 396, Automatic retry mechanism (5 retries, one after every 5s). The failure is not detected while the SAM Cabin is in software emergency mode.	Connected loads are always off	1. The wiring harness to connected loads is shorted to ground 2. The connected loads are not functioning properly	1. Check the wiring harness to the connected loads 2. Check loads	1. The SAM cabin parameter 'par_clearance_II_lamp_fault_reporting' contains "Short to GND" 2. Clearance lamps II are active.	> 1.5 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521705	3	Auxillary circulation fan windshield, ACC - Voltage above normal, or shorted to high source	conn X16, pin 5	-	-	Pin 175	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin ECU model is set to "highline" 2. Battery voltage is greater than 9V and smaller than 16V 3. Auxillary circulation fan - windshield, ACC is inactive	> 8 V
33	521705	4	Auxillary circulation fan windshield, ACC - Voltage below normal, or shorted to low source	conn X16, pin 5	-	-	Pin 175, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin ECU model is set to "highline" 2. Auxillary circulation fan - windshield, ACC is active	> 14.5 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521708	5	Clearance lamps I - Current below normal, or open circuit	conn X16, pin 8	-	-	Pin 395	No load is connected	1. The wiring harness to the connected load is open 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_clearance_lamp_fault_reporting' contains "Open Load" 2. Battery voltage is greater than 11.6V and smaller than 16V 3. Switch park brake switch from engaged to disengaged or vice-versa, or switch ignition switch from crank to ignition	> 50 kOhm
33	521708	3	Clearance lamps I - Voltage above normal, or shorted to high source	conn X16, pin 8	-	-	Pin 395	Connected loads are always supplied	The wiring harness to the connected loads is shorted to battery	Check the wiring harness to the connected loads	1. The SAM cabin parameter 'par_clearance_lamp_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Clearance lamps I are inactive.	> 4.1 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521708	4	Clearance lamps I - Voltage below normal, or shorted to low source	conn X16, pin 8	-	-	Pin 395, Automatic retry mechanism (5 retries, one after every 5s). The failure is not detected while the SAM Cabin is in software emergency mode.	Connected loads are always off	1. The wiring harness to connected loads is shorted to ground 2. The connected loads are not functioning properly	1. Check the wiring harness to the connected loads 2. Check loads	1. The SAM cabin parameter 'par_clearance_lamp_fault_reporting' contains "Short to GND" 2. Clearance lamps I are active.	> 1.1 A
33	521711	3	Dome lamps driver and passenger - Voltage above normal, or shorted to high source	conn X16, pin 11 conn X16, pin 14	-	-	Common DTC for pins 532 (dome lamp driver / forward overhead, X16/11) and 534 (dome lamp passenger, X16/14)	Connected loads are always supplied	The wiring harness to the connected loads is shorted to battery	Check the wiring harness to the connected loads	1. Battery voltage is greater than 9V and smaller than 16V 2. Dome lamp driver / forward overhead is inactive.	> 8 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521711	4	Dome lamps driver and passenger - Voltage below normal, or shorted to low source	conn X16, pin 11 conn X16, pin 14	-	-	Common DTC for pins 532 (dome lamp driver / forward overhead, X16/11) and 534 (dome lamp passenger, X16/14). Automatic retry mechanism (5 retries, one after every 5s)	Connected loads are always off	1. The wiring harness to connected loads is shorted to ground 2. The connected loads are not functioning properly	1. Check the wiring harness to the connected loads 2. Check loads	Dome lamp driver / forward overhead is active	> 10.9 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521802	4	Mirror heating passenger - Voltage below normal, or shorted to low source	conn X17, pin 2	F28	R10	Pin 273, Short to ground can be also active in case of stuck relay.	Connected load is always off	1. The wiring harness to the connected load is shorted to ground 2. Fuse is blown 3. Relay is stuck	1. Check the wiring harness to the connected load 2. Check fuse 3. Check relay	cabin parameter 'par_mirror_heating_exists' is set to "yes" 2. The SAM cabin parameter 'par_door_module_exists' is set to "not present" 3. The SAM cabin parameter 'par_mirror_heating_fault_reporting' contains "Short to GND" 4. Battery voltage is greater than 9V and smaller than 16V 5. Mirror heating passenger	blown fuse / removed fuse

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521803	3	Door sill lamp passenger - Voltage above normal, or shorted to high source	conn X17, pin 3	-	-	Pin 404	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connecte d load	1. The SAM cabin parameter 'par_entry_li ghting' is set to "present" 2. The SAM cabin parameter 'par_entry_li ghting_activ ate_with_do or' contains "Door sill lamps" 3. Battery voltage is greater than 9V and smaller than 16V 4. Door sill lamp passenger (in door, to ground) is inactive	> 4.1 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521803	4	Door sill lamp passenger - Voltage below normal, or shorted to low source	conn X17, pin 3	-	-	Pin 404, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	<p>1. The wiring harness to connected load is shorted to ground</p> <p>2. The connected load is not functioning properly</p>	<p>1. Check the wiring harness to the connected load</p> <p>2. Check load</p>	<p>1. The SAM cabin parameter 'par_entry_lighting' is set to "present"</p> <p>2. The SAM cabin parameter 'par_entry_lighting_activate_with_door' contains "Door sill lamps"</p> <p>3. Door sill lamp passenger (in door, to ground) is active</p>	> 1.5 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521905	5	Low beam left - Current below normal, or open circuit	conn X18, pin 5	-	-	Pin 453	No load is connected	<p>1. The wiring harness to the connected load is open</p> <p>2. The connected load is not functioning properly</p>	<p>1. Check the wiring harness to the connected load</p> <p>2. Check load</p>	<p>1. The SAM cabin parameter 'par_headlight_lowbeam_fault_reporting' contains "Open Load"</p> <p>2. Battery voltage is greater than 9V and smaller than 16V</p> <p>3. Switch park brake switch from engaged to disengaged or vice-versa, OR switch ignition switch from crank to ignition, OR switch low beam left from active to inactive</p>	> 50 kOhm

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521905	3	Low beam left - Voltage above normal, or shorted to high source	conn X18, pin 5	-	-	Pin 453	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_headlight_lowbeam_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Low beam left is inactive	> 8 V
33	521905	4	Low beam left - Voltage below normal, or shorted to low source	conn X18, pin 5	-	-	Pin 453, Automatic retry mechanism (5 retries, one after every 5s). There is no fault detection during ramp up; this means the retry starts after the maximum duty cycle (100%) is reached.	Connected load is always off	The wiring harness to the connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_headlight_lowbeam_fault_reporting' contains "Short to GND" 2. Low beam left is active	> 14.3 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521906	5	High beam left - Current below normal, or open circuit	conn X18, pin 6	-	-	Pin 439	No load is connected	1. The wiring harness to the connected load is open 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_headlight_highbeam_fault_reporting' contains "Open Load" 2. Battery voltage is greater than 9V and smaller than 16V 3. High beam left transition from active to inactive	< 90 mV
33	521906	3	High beam left - Voltage above normal, or shorted to high source	conn X18, pin 6	-	-	Pin 439	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_headlight_highbeam_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. High beam left is inactive	> 8 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521906	4	High beam left - Voltage below normal, or shorted to low source	conn X18, pin 6	-	-	Pin 439, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	The wiring harness to connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_headlight_highbeam_fault_reporting' contains "Short to GND" 2. High beam left is active	> 14.3 A
33	521908	5	Marker lamp corner front right - Current below normal, or open circuit	conn X18, pin 8	-	-	Pin 475	No load is connected	1. The wiring harness to the connected load is open 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_marker_lamp_FCNR_fault_reporting' contains "Open Load" 2. Battery voltage is greater than 9V and smaller than 16V 3. Switch park brake switch from engaged to disengaged or vice-versa, or switch ignition switch from crank to ignition	> 50 kOhm

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521908	3	Marker lamp corner front right - Voltage above normal, or shorted to high source	conn X18, pin 8	-	-	Pin 475	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_marker_lamp_FCNR_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Marker lamp corner front right is inactive	> 4.1 V
33	521908	4	Marker lamp corner front right - Voltage below normal, or shorted to low source	conn X18, pin 8	-	-	Pin 475, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	The wiring harness to the connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_marker_lamp_FCNR_fault_reporting' contains "Short to GND" 2. Marker lamp corner front right is active	> 1.5 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521909	5	Turn right front corner - Current below normal, or open circuit	conn X18, pin 9	-	-	Pin 505, error detection depends on parameter.	No load is connected Right turn signals are flashing at twice the normal frequency	1. The wiring harness to the connected load is open 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_turn_signal_corner_fault_reporting' contains "Open Load" 2. Battery voltage is greater than 9V and smaller than 16V 3. Switch park brake switch from engaged to disengaged or vice-versa or switch ignition switch from crank to ignition or activate turn right front corner.	> 50 kOhm

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521909	3	Turn right front corner - Voltage above normal, or shorted to high source	conn X18, pin 9	-	-	Pin 505, error detection depends on parameter.	Connected load is always supplied. Right turn signals are flashing at twice the normal frequency	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_turn_signal_corner_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Turn Right Front corner is inactive	> 4.1 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521909	4	Turn right front corner - Voltage below normal, or shorted to low source	conn X18, pin 9	-	-	Pin 505, error detection depends on parameter. Automatic retry mechanism: 5 retries, one retry after every "rising edge" (in case of functional request via Turn or Hazard switch) OR one retry after every 5s (in case of output activation via IO Control or DRL)	Connected load is always off. Right turn signals are flashing at twice the normal frequency	The wiring harness to connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_turn_signal_corner_fault_reporting' contains "Short to GND" 2. Turn Right Front corner is active	> 6.4 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521912	5	Marker lamp, front right - Current below normal, or open circuit	conn X18, pin 12	-	-	Pin 473. The Open Load failure detection on Marker lamp front right is inhibited if Turn right front side (pin-506) is shorted to battery	No load is connected	1. The wiring harness to the connected load is open 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_marker_lamp_FRN_T_fault_reporting' contains "Open Load" 2. Battery voltage is greater than 11.6V and smaller than 16V 3. Switch park brake switch from engaged to disengaged or vice-versa, or switch ignition switch from crank to ignition	> 50 kOhm
33	521912	3	Marker lamp, front right - Voltage above normal, or shorted to high source	conn X18, pin 12	-	-	Pin 473. Marker lamp front right shorted to battery inhibits the Open Load failure detection on Turn right front side (pin-506)	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_marker_lamp_FRN_T_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Marker Lamp, front right is inactive	> 4.1 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521912	4	Marker lamp, front right - Voltage below normal, or shorted to low source	conn X18, pin 12	-	-	Pin 473, Automatic retry mechanism (5 retries, one after every 5s). The failure is not detected while the SAM Cabin is in software emergency mode.	Connected load is always off	The wiring harness to connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_marker_lamp_FRN_T_fault_reporting' contains "Short to GND" 2. Marker Lamp, front right is active	> 1.5 A
33	521914	5	Marker lamp, front left - Current below normal, or open circuit	conn X18, pin 14	-	-	Pin 472. The Open Load failure detection on Marker lamp front left is inhibited if Turn left front side (pin-501) is shorted to battery	No load is connected	1. The wiring harness to the connected load is open 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_marker_lamp_FRN_T_fault_reporting' contains "Open Load" 2. Battery voltage is greater than 11.6V and smaller than 16V 3. Switch park brake switch from engaged to disengaged or vice-versa, or switch ignition switch from crank to ignition	> 50 kOhm

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521914	3	Marker lamp, front left - Voltage above normal, or shorted to high source	conn X18, pin 14	-	-	Pin 472. Marker lamp front left shorted to battery inhibits the Open Load failure detection on Turn left front side (pin-501)	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_marker_lamp_FRN_T_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Marker Lamp, front left is inactive	> 4.1 V
33	521914	4	Marker lamp, front left - Voltage below normal, or shorted to low source	conn X18, pin 14	-	-	Pin 472, Automatic retry mechanism (5 retries, one after every 5s). The failure is not detected while the SAM Cabin is in software emergency mode.	Connected load is always off	The wiring harness to the connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_marker_lamp_FRN_T_fault_reporting' contains "Short to GND" 2. Marker Lamp, front left is active	> 1.5 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521915	5	Daytime running light right - Current below normal, or open circuit	conn X18, pin 15	-	-	Pin 407	No load is connected	<p>1. The wiring harness to the connected load is open</p> <p>2. The connected load is not functioning properly</p>	<p>1. Check the wiring harness to the connected load</p> <p>2. Check load</p>	<p>cabin parameter 'par_drl_config' is set to "present"</p> <p>2. The SAM cabin parameter 'par_drl_activate_drlpin' is set to "activated"</p> <p>3. The SAM cabin parameter 'par_drl_fault_reporting' contains "Open Load"</p> <p>4. Battery voltage is greater than 9V and smaller than 16V</p> <p>5. Switch park brake switch from engaged to disengaged or vice-versa, or</p>	> 50 kOhm

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521915	3	Daytime running light right - Voltage above normal, or shorted to high source	conn X18, pin 15	-	-	Pin 407	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_drl_config' is set to "present" 2. The SAM cabin parameter 'par_drl_activate_drlpin' is set to "activated" 3. The SAM cabin parameter 'par_drl_fault_reporting' contains "Short to BAT" 4. Battery voltage is greater than 9V and smaller than 16V 5. Daytime running light, right is inactive	> 4.1 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521915	4	Daytime running light right - Voltage below normal, or shorted to low source	conn X18, pin 15	-	-	Pin 407, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	<p>1. The wiring harness to connected load is shorted to ground</p> <p>2. The connected load is not functioning properly</p>	<p>1. Check the wiring harness to the connected load</p> <p>2. Check load</p>	<p>1. The SAM cabin parameter 'par_drl_config' is set to "present"</p> <p>2. The SAM cabin parameter 'par_drl_activate_drlpin' is set to "activated"</p> <p>3. The SAM cabin parameter 'par_drl_fault_reporting' contains "Short to GND"</p> <p>4. Daytime running light, right is active</p>	> 6.4 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521916	5	Marker lamp corner front left - Current below normal, or open circuit	conn X18, pin 16	-	-	Pin 474	No load is connected	1. The wiring harness to the connected load is open 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_marker_lamp_FCNR_fault_reporting' contains "Open Load" 2. Battery voltage is greater than 9V and smaller than 16V 3. Switch park brake switch from engaged to disengaged or vice-versa, or switch ignition switch from crank to ignition	> 50 kOhm
33	521916	3	Marker lamp corner front left - Voltage above normal, or shorted to high source	conn X18, pin 16	-	-	Pin 474	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_marker_lamp_FCNR_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Marker lamp corner front left is inactive	> 4.1 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521916	4	Marker lamp corner front left - Voltage below normal, or shorted to low source	conn X18, pin 16	-	-	Pin 474, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	The wiring harness to connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_marker_lamp_FCN_R_fault_reporting' contains "Short to GND" 2. Marker lamp corner front left is active	> 1.5 A
33	521917	5	High beam right - Current below normal, or open circuit	conn X18, pin 17	-	-	Pin 440	No load is connected	1. The wiring harness to the connected load is open 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_headlight_highbeam_fault_reporting' contains "Open Load" 2. Battery voltage is greater than 9V and smaller than 16V 3. High beam right transition from active to inactive	< 90 mV

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521917	3	High beam right - Voltage above normal, or shorted to high source	conn X18, pin 17	-	-	Pin 440	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_headlight_highbeam_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. High beam right is inactive	> 8 V
33	521917	4	High beam right - Voltage below normal, or shorted to low source	conn X18, pin 17	-	-	Pin 440, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	The wiring harness to the connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_headlight_highbeam_fault_reporting' contains "Short to GND" 2. High beam right is active	> 14.3 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521918	5	Daytime running light left - Current below normal, or open circuit	conn X18, pin 18	-	-	Pin 406	No load is connected	<p>1. The wiring harness to the connected load is open</p> <p>2. The connected load is not functioning properly</p>	<p>1. Check the wiring harness to the connected load</p> <p>2. Check load</p>	<p>cabin parameter 'par_drl_config' is set to "present"</p> <p>2. The SAM cabin parameter 'par_drl_activate_drlpin' is set to "activated"</p> <p>3. The SAM cabin parameter 'par_drl_fault_reporting' contains "Open Load"</p> <p>4. Battery voltage is greater than 9V and smaller than 16V</p> <p>5. Switch park brake switch from engaged to disengaged or vice-versa, or</p>	> 50 kOhm

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521918	3	Daytime running light left - Voltage above normal, or shorted to high source	conn X18, pin 18	-	-	Pin 406	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_drl_config' is set to "present" 2. The SAM cabin parameter 'par_drl_activate_drlpin' is set to "activated" 3. The SAM cabin parameter 'par_drl_fault_reporting' contains "Short to BAT" 4. Battery voltage is greater than 9V and smaller than 16V 5. Daytime running light, left is inactive	> 4.1 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521918	4	Daytime running light left - Voltage below normal, or shorted to low source	conn X18, pin 18	-	-	Pin 406, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	<p>1. The wiring harness to connected load is shorted to ground</p> <p>2. The connected load is not functioning properly</p>	<p>1. Check the wiring harness to the connected load</p> <p>2. Check load</p>	<p>1. The SAM cabin parameter 'par_drl_config' is set to "present"</p> <p>2. The SAM cabin parameter 'par_drl_activate_drlpin' is set to "activated"</p> <p>3. The SAM cabin parameter 'par_drl_fault_reporting' contains "Short to GND"</p> <p>4. Daytime running light, left is active</p>	> 6.4 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521919	5	Turn left front corner - Current below normal, or open circuit	conn X18, pin 19	-	-	Pin 500, error detection depends on parameter.	No load is connected Left turn signals are flashing at twice the normal frequency	1. The wiring harness to the connected load is open 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_turn_signal_corner_fault_reporting' contains "Open Load" 2. Battery voltage is greater than 9V and smaller than 16V 3. Switch park brake switch from engaged to disengaged or vice-versa or switch ignition switch from crank to ignition or activate turn left front corner.	> 50 kOhm

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521919	3	Turn left front corner - Voltage above normal, or shorted to high source	conn X18, pin 19	-	-	Pin 500, error detection depends on parameter.	Connected load is always supplied. Left turn signals are flashing at twice the normal frequency	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_turn_signal_corner_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Turn Left Front corner is inactive	> 4.1 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521919	4	Turn left front corner - Voltage below normal, or shorted to low source	conn X18, pin 19	-	-	Pin 500, error detection depends on parameter. Automatic retry mechanism: 5 retries, one retry after every "rising edge" (in case of functional request via Turn or Hazard switch) OR one retry after every 5s (in case of output activation via IO Control or DRL)	Connected load is always off. Left turn signals are flashing at twice the normal frequency	The wiring harness to connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_turn_signal_corner_fault_reporting' contains "Short to GND" 2. Turn Left Front corner is active	> 6.4 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521920	5	Low beam right - Current below normal, or open circuit	conn X18, pin 20	-	-	Pin 454	No load is connected	<p>1. The wiring harness to the connected load is open</p> <p>2. The connected load is not functioning properly</p>	<p>1. Check the wiring harness to the connected load</p> <p>2. Check load</p>	<p>1. The SAM cabin parameter 'par_headlight_lowbeam_fault_reporting' contains "Open Load"</p> <p>2. Battery voltage is greater than 9V and smaller than 16V</p> <p>3. Switch park brake switch from engaged to disengaged or vice-versa, OR switch ignition switch from crank to ignition, OR switch low beam right from active to inactive</p>	> 50 kOhm

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521920	3	Low beam right - Voltage above normal, or shorted to high source	conn X18, pin 20	-	-	Pin 454	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_headlight_lowbeam_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Low beam right is inactive	> 8 V
33	521920	4	Low beam right - Voltage below normal, or shorted to low source	conn X18, pin 20	-	-	Pin 454, Automatic retry mechanism (5 retries, one after every 5s). There is no fault detection during ramp up; this means the retry starts after the maximum duty cycle (100%) is reached.	Connected load is always off	The wiring harness to the connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_headlight_lowbeam_fault_reporting' contains "Short to GND" 2. Low beam right is active	> 14.3 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	521921	6	Horn electric - Current above normal, or grounded circuit	conn X18, pin 21	-	-	Pin 3030, Automatic retry mechanism (3 retries, one after every 1s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	Electric horn is active	> 25.5 A
33	521921	5	Horn electric - Current below normal, or open circuit	conn X18, pin 21	-	-	Pin 3030. An Open Load applied while Electric Horn is active will be reported only on the deactivation of a new functional request.	No load is connected	1. The wiring harness to the connected load is open 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. Battery voltage is greater than 9V and smaller than 16V 2. Electric horn is switched from active to inactive	< 0.01 A
33	521921	3	Horn electric - Voltage above normal, or shorted to high source	conn X18, pin 21	-	-	Pin 3030	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. Battery voltage is greater than 9V and smaller than 16V 2. Electric horn is inactive	> 8 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522003	3	Starter relay 3 - Voltage above normal, or shorted to high source	conn X19, pin 3	-	-	Pin 359. Due to the nature of this failure, a short mature time is required.	Connected load is always supplied	1. The wiring harness to connected load is shorted to battery 2. The connected load is not functioning properly	1. Check the wiring harness to connected load 2. Check load	1. The SAM cabin parameter 'par_starter_relay_output_control' is set to "SAM CAB" 2. Battery voltage is greater than 9V and smaller than 16V 3. Starter relay is inactive	> 6.7 V
33	522003	4	Starter relay 3 - Voltage below normal, or shorted to low source	conn X19, pin 3	-	-	Pin 359, this fault is required to violate the Crank sequence (pin is only active during Crank)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin parameter 'par_starter_relay_output_control' is set to "SAM CAB" 2. Starter relay is active	> 15.9 A
33	522006	5	A/C Compress or clutch - Current below normal, or open circuit	conn X19, pin 6	-	-	Pin 155	No load is connected	1. The wiring harness to the connected load is open 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. Battery voltage is greater than 9V and smaller than 16V 2. A/C compressor clutch is switched from active to inactive	< 0.01 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522006	3	A/C Compress or clutch - Voltage above normal, or shorted to high source	conn X19, pin 6	-	-	Pin 155	Connected load is always supplied	1. The wiring harness to connected load is shorted to battery 2. The connected load is not functioning properly	1. Check the wiring harness to connected load 2. Check load	1. Battery voltage is greater than 9V and smaller than 16V 2. A/C compressor clutch is inactive	> 8 V
33	522006	4	A/C Compress or clutch - Voltage below normal, or shorted to low source	conn X19, pin 6	-	-	Pin 155, Automatic retry mechanism (3 retries, one after every 1s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	A/C compressor clutch is active	> 14.5 A
33	522009	4	Activate PTO solenoid - Voltage below normal, or shorted to low source	conn X19, pin 9	-	-	Pin 83, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter "par_activate_pto_solenoid" is set to "yes" 3. Activate PTO solenoid (control) is on	> 3.5 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522010	2	HVAC pressure transducer, feedback - Data erratic, intermittent or incorrect	conn X19, pin 10	-	-	Pin 3069, Failure can be also active in case of short to ground or battery. Fault condition might apply either to the input side or the supply side.	Sensor signal is not available	1. The wiring harness to connected load is shorted to ground, shorted to battery or open 2. The load is not functioning properly	1. Check the wiring harness to connected load 2. Check load	1. The SAM cabin parameter 'par_HVAC_Pressure_Transducer' is set to "present" 2. Battery voltage is greater than 9V and smaller than 16V 3. The ignition switch is not in the OFF position.	< 2 % > 98 %
33	522018	3	Engine ECU, IGN - Voltage above normal, or shorted to high source	conn X19, pin 18	-	-	Pin 336	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. Battery voltage is greater than 9V and smaller than 16V 2. IGN_1 normal mode pin group is inactive	> 4.1 V
33	522018	4	Engine ECU, IGN - Voltage below normal, or shorted to low source	conn X19, pin 18	-	-	Pin 336, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	IGN_1 normal mode pin group is active	> 1.7 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522020	3	Ether start power - Voltage above normal, or shorted to high source	conn X19, pin 20	-	-	Pin 345	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. Battery voltage is greater than 9V and smaller than 16V 2. Ether start power is inactive	> 4.1 V
33	522020	4	Ether start power - Voltage below normal, or shorted to low source	conn X19, pin 20	-	-	Pin 345, this fault is required to violate the Crank sequence (pin is only active during Crank)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	Ether start power is active	> 2.7 A
33	522021	3	PTO solenoid activated - Voltage above normal, or shorted to high source	conn X19, pin 21	-	-	Pin 2790	Connected load is always supplied	1. The wiring harness to the connected load is shorted to battery 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_PTO solenoid activated' is set to "yes" 3. Battery voltage greater than 9V and smaller than 16V 4. PTO solenoid activated is off	> 4 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522021	4	PTO solenoid activated - Voltage below normal, or shorted to low source	conn X19, pin 21	-	-	Pin 2790, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	1. The SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_PTO solenoid activated' is set to "yes" 3. PTO solenoid activated is on	> 3.5 A
33	522108	5	Fog lamp front left - Current below normal, or open circuit	conn X20, pin 8	-	-	Pin 416	No load is connected	1. The wiring harness to the connected load is open 2. The connected load is not functioning properly	1. Check the wiring harness to the connected load 2. Check load	cabin parameter 'par_fog_lamp_front_config' is set to "present" 2. The SAM cabin parameter 'par_fog_lamp_front_fault_reporting' contains "Open Load" 3. Battery voltage is greater than 9V and smaller than 16V 4. Switch park brake switch from engaged to disengaged or vice-versa, OR switch ignition switch from crank to ignition, OR	> 50 kOhm

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522108	3	Fog lamp front left - Voltage above normal, or shorted to high source	conn X20, pin 8	-	-	Pin 416	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_fog_la mp_front_config' is set to "present" 2. The SAM cabin parameter 'par_fog_la mp_front_fault_reporting' contains "Short to BAT" 3. Battery voltage is greater than 9V and smaller than 16V 4. Fog lamp, front left is inactive	> 8 V
33	522108	4	Fog lamp front left - Voltage below normal, or shorted to low source	conn X20, pin 8	-	-	Pin 416, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	The wiring harness to the connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_fog_la mp_front_config' is set to "present" 2. The SAM cabin parameter 'par_fog_la mp_front_fault_reporting' contains "Short to GND" 3. Fog lamp, front left is active	> 14.3 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522110	3	High beam auxiliary left - Voltage above normal, or shorted to high source	conn X20, pin 10	-	-	Pin 435	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connecte d load	1. The SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_auxiliar y_headlights _high' is set to "present" 3. The SAM cabin parameter 'par_aux_he adlights_hig h_fault_repo rting' contains "Short to BAT" 4. Battery voltage is greater than 9V and smaller than 16V 5. High Beam auxiliary, left is inactive	> 8 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522110	4	High beam auxiliary left - Voltage below normal, or shorted to low source	conn X20, pin 10	-	-	Pin 435, Automatic retry mechanis m (5 retries, one after every 5s)	Connected load is always off	The wiring harness to connected load is shorted to ground	Check the wiring harness to the connecte d load	1. The SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_auxiliar y_headlights _high' is set to "present" 3. The SAM cabin parameter 'par_aux_he adlights_hig h_fault_repo rting' contains "Short to GND" 4. High Beam auxiliary, left is active	> 14.3 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522111	3	Low beam auxiliary left - Voltage above normal, or shorted to high source	conn X20, pin 11	-	-	Pin 2874	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connecte d load	1. The SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_auxiliar y_headlights _low' is set to "present" 3. The SAM cabin parameter 'par_aux_he adlights_low _fault_report ing' contains "Short to BAT" 4. Battery voltage is greater than 9V and smaller than 16V 5. Low Beam auxiliary, left is inactive	> 8 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522111	4	Low beam auxiliary left - Voltage below normal, or shorted to low source	conn X20, pin 11	-	-	Pin 2874, Automatic retry mechanis m (5 retries, one after every 5s)	Connected load is always off	The wiring harness to connected load is shorted to ground	Check the wiring harness to the connecte d load	1. The SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_auxiliar y_headlights _low' is set to "present" 3. The SAM cabin parameter 'par_aux_he adlights_low _fault_report ing' contains "Short to GND" 4. Low Beam auxiliary, left is active	> 14.3 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522112	3	High beam auxiliary right - Voltage above normal, or shorted to high source	conn X20, pin 12	-	-	Pin 437	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connecte d load	1. The SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_auxiliar y_headlights _high' is set to "present" 3. The SAM cabin parameter 'par_aux_he adlights_hig h_fault_repo rting' contains "Short to BAT" 4. Battery voltage is greater than 9V and smaller than 16V 5. High Beam auxiliary, right is inactive	> 8 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522112	4	High beam auxiliary right - Voltage below normal, or shorted to low source	conn X20, pin 12	-	-	Pin 437, Automatic retry mechanis m (5 retries, one after every 5s)	Connected load is always off	The wiring harness to connected load is shorted to ground	Check the wiring harness to the connecte d load	1. The SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_auxiliar y_headlights _high' is set to "present" 3. The SAM cabin parameter 'par_aux_he adlights_hig h_fault_repo rting' contains "Short to GND" 4. High Beam auxiliary, right is active	> 14.3 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522114	3	Low beam auxiliary right - Voltage above normal, or shorted to high source	conn X20, pin 14	-	-	Pin 2875	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connecte d load	1. The SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_auxiliar y_headlights _low' is set to "present" 3. The SAM cabin parameter 'par_aux_he adlights_low _fault_report ing' contains "Short to BAT" 4. Battery voltage is greater than 9V and smaller than 16V 5. Low Beam auxiliary, right is inactive	> 8 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522114	4	Low beam auxiliary right - Voltage below normal, or shorted to low source	conn X20, pin 14	-	-	Pin 2875, Automatic retry mechanis m (5 retries, one after every 5s)	Connected load is always off	The wiring harness to connected load is shorted to ground	Check the wiring harness to the connecte d load	1. The SAM cabin ECU model is set to "highline" 2. The SAM cabin parameter 'par_auxiliar y_headlights _low' is set to "present" 3. The SAM cabin parameter 'par_aux_he adlights_low _fault_report ing' contains "Short to GND" 4. Low Beam auxiliary, right is active	> 14.3 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522116	2	Temperature sensor outside air, feedback - Data erratic, intermittent or incorrect	conn X20, pin 16	-	-	Pin 313, Failure can be also active in case of short to ground or battery.	Sensor signal is not available	1. The wiring harness to connected load is shorted to ground, shorted to battery or open 2. The load is not functioning properly	1. Check the wiring harness to connected load 2. Check load	1. The SAM cabin parameter 'par_outside_temperature_sensor' is set to "present, analog sensor input" 2. Battery voltage is greater than 9V and smaller than 16V 3. Ambient temperature is greater than -40°C and smaller than +100°C	> 101 kOhm < 0.200 kOhm

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522117	5	Fog lamp front right - Current below normal, or open circuit	conn X20, pin 17	-	-	Pin 417	No load is connected	<p>1. The wiring harness to the connected load is open</p> <p>2. The connected load is not functioning properly</p>	<p>1. Check the wiring harness to the connected load</p> <p>2. Check load</p>	<p>cabin parameter 'par_fog_lamp_front_config' is set to "present"</p> <p>2. The SAM cabin parameter 'par_fog_lamp_front_fault_reporting' contains "Open Load"</p> <p>3. Battery voltage is greater than 9V and smaller than 16V</p> <p>4. Switch park brake switch from engaged to disengaged or vice-versa, OR switch ignition switch from crank to ignition, OR</p>	> 50 kOhm

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522117	3	Fog lamp front right - Voltage above normal, or shorted to high source	conn X20, pin 17	-	-	Pin 417	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_fog_la mp_front_co nfig' is set to "present" 2. The SAM cabin parameter 'par_fog_la mp_front_fa ult_reporting ' contains "Short to BAT" 3. Battery voltage is greater than 9V and smaller than 16V 4. Fog lamp, front right is inactive	> 8 V
33	522117	4	Fog lamp front right - Voltage below normal, or shorted to low source	conn X20, pin 17	-	-	Pin 417, Automatic retry mechanism (5 retries, one after every 5s)	Connected load is always off	The wiring harness to connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM cabin parameter 'par_fog_la mp_front_co nfig' is set to "present" 2. The SAM cabin parameter 'par_fog_la mp_front_fa ult_reporting ' contains "Short to GND" 3. Fog lamp, front right is active	> 14.3 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522119	3	Ignition group 2 - Voltage above normal, or shorted to high source	conn X19, pin 11 conn X20, pin 19	-	-	Common DTC for pins 281 (distance sensor adaptive cruise control, IGN, X20/19) and 323 (air intake warmer/grid heater, IGN, X19/11)	Connected loads are always supplied	The wiring harness to the connected loads is shorted to battery	Check the wiring harness to the connected loads	1. The SAM cabin ECU model is set to "highline" 2. Battery voltage is greater than 9V and smaller than 16V 3. Distance sensor (adaptive cruise control), supply is inactive	> 8 V
33	522119	4	Ignition group 2 - Voltage below normal, or shorted to low source	conn X19, pin 11 conn X20, pin 19	-	-	Common DTC for pins 281 (distance sensor adaptive cruise control, IGN, X20/19) and 323 (air intake warmer/grid heater, IGN, X19/11). Automatic retry mechanism (5 retries, one after every 5s)	Connected loads are always off	1. The wiring harness to connected loads is shorted to ground 2. The connected loads are not functioning properly	1. Check the wiring harness to the connected loads 2. Check loads	1. The SAM cabin ECU model is set to "highline" 2. Distance sensor (adaptive cruise control), supply is active	> 9.2 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522121	3	Washer fluid level sensor - Voltage above normal, or shorted to high source	conn X20, pin 21	-	-	Pin 792	Sensor always reports off	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connecte d load	Battery voltage is greater than 9V and smaller than 16V	> 7 V
33	522209	2	Wiper parked - Data erratic, intermitt t or incorrect	conn X21, pin 9	-	-	"Pin 799. The fault will be detected if either the park switch is open for 5 seconds OR closed for 2 seconds while the wiper low or wiper high output is active."	Erratic wiper behavior	1. The wiring harness to Wiper parked is shorted to ground, shorted to battery or open 2. The wiring harness to Wiper low is open 3. The wiring harness to Wiper high is open 4. Wiper parked switch is not functionin g properly	1. Check the wiring harness to Wiper parked 2. Check the wiring harness to Wiper low 3. Check the wiring harness to Wiper high 4. Check the Wiper parked switch	1. Battery voltage is greater than 9V and smaller than 16V 2. Wiper Low or Wiper High is active or INT 1, 2, 3 is active	> 6 V (park position) < 1 V (out of park position)

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522210	3	Horn pneumatic - Voltage above normal, or shorted to high source	conn X21, pin 10	-	-	Pin 4	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connecte d load	1. The SAM cabin parameter 'par_air_hor n' is set to "present" 2. Battery voltage is greater than 9V and smaller than 16V 3. Pneumatic horn is inactive	> 4.1 V
33	522210	4	Horn pneumatic - Voltage below normal, or shorted to low source	conn X21, pin 10	-	-	Pin 4, Automatic retry mechanis m (3 retries, one after every 1s)	Connected load is always off	1. The wiring harness to connected load is shorted to ground 2. The connected load is not functionin g properly	1. Check the wiring harness to the connecte d load 2. Check load	1. The SAM cabin parameter 'par_air_hor n' is set to "present" 2. Pneumatic horn is active	> 1.6 A

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522213	31	LVD sense BAT / emergenc y supply - Condition exists	conn X21, pin 13	-	-	Pin 613	Emergency and LVD functionality are not working properly	1. The wiring harness to Pin-613 is disconnec ted or shorted to ground 2. The wiring harness to Pin- 3063 is disconnec ted or shorted to battery	Check wiring harness	Battery voltage is greater than 11.5 V and smaller than 15 V	"low voltage disconnect sense, BAT" < "SAM_CA B, BAT" - 1V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	522215	6	Wiper high and wiper low - Current above normal, or grounded circuit	conn X21, pin 15 conn X21, pin 12	-	-	DTC for pins 797 (wiper high, X21/15) and 798 (wiper low, X21/12). If the wiper is driven in mode high (pin 797), an overcurrent failure will be detected on wiper low (pin 798) and/or wiper high (pin 797). If the wiper is driven in mode low (pin 798), an overcurrent failure	Connected loads are always off	1. The wiring harness to connected loads is shorted to ground 2. The connected loads are not functioning properly	1. Check the wiring harness to the connected loads 2. Check loads	Wiper High and/or Wiper Low is active	> 27 A for WiperHigh OR > 25.7 A for WiperLow
33	522215	3	Wiper high and wiper low - Voltage above normal, or shorted to high source	conn X21, pin 15 conn X21, pin 12	-	-	Common DTC for pins 797 (wiper high, X21/15) and 798 (wiper low, X21/12).	Connected load is always supplied	The wiring harness to the connected load is shorted to battery	Check the wiring harness to the connected load	1. Battery voltage is greater than 9V and smaller than 16V 2. Wiper high and wiper low are inactive	> 8 V

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	524037	31	Lost communication with CGW	conn X13, pin 2 conn X13, pin 3	-	-	CAN bus is connected to pin 189 (Cabin CAN High, X13/3) and 190 (Cabin CAN Low, X13/2) ; relevant for this timeout are CGW_R1, CGW_R2 and CGW_C1	none	1. Cabin CAN data link compromised 2. ECU is not powered	1. Check the Cabin CAN data link 2. Check ECU power supply	1. Battery voltage is greater than 9V and smaller than 16V 2. CAN bus active (e.g. ignition is on)	CGW_R1 OR CGW_R2 OR CGW_C1 messages not received for 10 times
33	524049	31	Lost communication with MSF	conn X13, pin 2 conn X13, pin 3	-	-	CAN bus is connected to pin 189 (Cabin CAN High, X13/3) and 190 (Cabin CAN Low, X13/2) ; relevant for this timeout are MSF_A1, MSF_A2 AND MSF_A3	MSF switched outputs cannot be activated/deactivated. Headlamps, marker lamps, clearance lamps are active due to failsafe reaction	1. Cabin CAN data link compromised 2. ECU is not powered	1. Check the Cabin CAN data link 2. Check ECU power supply	1. Battery voltage is greater than 9V and smaller than 16V 2. CAN bus active (e.g. ignition is on)	MSF_A1 OR MSF_A2 OR MSF_A3 messages not received for 10 times

SAM Cab CAN Fault Codes

SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
33	524071	31	Lost communication with SAM_CHAS	conn X13, pin 2 conn X13, pin 3	-	-	CAN bus is connected to pin 189 (Cabin CAN High, X13/3) and 190 (Cabin CAN Low, X13/2) ; relevant for this timeout are SAM_CHAS_A1 and SAM_CHAS_A3	SAM is operating in Emergency Mode. Headlamps are active, clearance and marker lamps are flashing, turn signal ICU indicators are alternating due to failsafe behavior	1. Cabin CAN data link compromised 2. ECU is not powered	1. Check the Cabin CAN data link 2. Check ECU power supply	1. Battery voltage is greater than 9V and smaller than 16V 2. CAN bus active (e.g. ignition is on)	SAM_CHAS_A1 OR SAM_CHAS_A3 messages not received for 10 times