

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	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	1. ECU is awake 2. CAN Signal BatVolt_Cval is valid	> 16 V
71	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	1. ECU is awake 2. CAN Signal BatVolt_Cval is valid	< 9.0 V
71	520201	3	CAN low - Voltage above normal, or shorted to high source	conn X51, pin 1	-	-	Pin 198	SAM is operating in Emergency Mode. Marker lamps and tail lamps are active, stop lamps and trailer tail lamps are flashing 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
71	520202	4	CAN high - Voltage below normal, or shorted to low source	conn X51, pin 2	-	-	Pin 197	SAM is operating in Emergency Mode. Marker lamps and tail lamps are active, stop lamps and trailer tail lamps are flashing due to failsafe behavior	1. Cabin CAN data link compromised 2. ECU is not powered	1. Check the Cabin CAN High wiring harness for all Cabin CAN ECUs 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)	< 0.2 V
71	520301	3	Marker lamp side right - Voltage above normal, or shorted to high source	conn X58, pin 13 conn X52, pin 1	-	-	Pin 478, marker lamp side right	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 chassis parameter 'par_marker_lamp_SIDE_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Marker lamp side right is inactive	> 4.2 V
71	520301	4	Marker lamp side right - Voltage below normal, or shorted to low source	conn X58, pin 13 conn X52, pin 1	-	-	Pin 478, marker lamp side right. Automatic retry mechanism (5 retries, one after every 5s). The failure is not detected while the SAM Chassis 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 chassis parameter 'par_marker_lamp_SIDE_fault_reporting' contains "Short to GND" 2. Marker lamp side right is active	> 14.5 A

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	520301	5	Marker lamp side right - Current below normal, or open circuit	conn X58, pin 13 conn X52, pin 1	-	-	Pin 478, marker lamp side right	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 chassis parameter 'par_marker_lamp_SIDE_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 fom crank to ignition	Pin > 12.5 V at Ubatt=14 V
71	520303	3	Marker lamp corner rear right - Voltage above normal, or shorted to high source	conn X52, pin 3	-	-	Pin 459, marker lamp corner rear right	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 chassis parameter 'par_marker_lamp_RCNR_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Marker lamp corner rear right is inactive	> 4.2 V
71	520303	4	Marker lamp corner rear right - Voltage below normal, or shorted to low source	conn X52, pin 3	-	-	Pin 459, marker lamp corner rear right. 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 chassis parameter 'par_marker_lamp_RCNR_fault_reporting' contains "Short to GND" 2. Marker lamp corner rear right is active	> 14.5 A
71	520303	5	Marker lamp corner rear right - Current below normal, or open circuit	conn X52, pin 3	-	-	Pin 459, marker lamp corner rear right	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 chassis parameter 'par_marker_lamp_RCNR_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 fom crank to ignition	Pin > 12.5 V at Ubatt=14 V
71	520306	4	Power feed ABS/BS, IGN - Voltage below normal, or shorted to low source	conn X52, pin 6	F6	R3	Pin 3060, 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	1. Battery voltage is greater than 9V and smaller than 16V. 2. Power feed ABS/BS is active	blown fuse / fuse removed

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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
71	520402	3	Marker lamp corner rear left - Voltage above normal, or shorted to high source	conn X53, pin 2	-	-	Pin 456, marker lamp corner rear left	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 chassis parameter 'par_marker_lamp_RCNr_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Marker lamp corner rear left is inactive	> 4.2 V
71	520402	4	Marker lamp corner rear left - Voltage below normal, or shorted to low source	conn X53, pin 2	-	-	Pin 456, marker lamp corner rear left. 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 chassis parameter 'par_marker_lamp_RCNr_fault_reporting' contains "Short to GND" 2. Marker lamp corner rear left is active	> 14.5 A
71	520402	5	Marker lamp corner rear left - Current below normal, or open circuit	conn X53, pin 2	-	-	Pin 456, marker lamp corner rear left	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 chassis parameter 'par_marker_lamp_RCNr_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 fom crank to ignition	Pin > 12.5 V at Ubatt=14 V
71	520407	3	Trailer turn lamp right - Voltage above normal, or shorted to high source	conn X53, pin 7	F8	R4	Pin 761, Short to battery can be also active in case of stuck relay.	Connected load is always supplied. Right turn signals are flashing at twice the normal frequency	1. The wiring harness to the connected load is shorted to battery 2. Relay is stuck	1. Check the wiring harness to the connected load 2. Check relay	1. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "Back of cab" 2. The SAM chassis parameter 'par_turn_signal_trailer_fault_reporting' contains "Short to BAT" 3. Battery voltage is greater than 9V and smaller than 16V 4. Trailer Turn Lamp Right is inactive	> 9 V

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	520407	4	Trailer turn lamp right - Voltage below normal, or shorted to low source	conn X53, pin 7	F8	R4	Pin 761, Short to ground can be also active in case of stuck relay.	Connected load is always off. Right turn signals are flashing at twice the normal frequency	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	1. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "Back of cab" 2. The SAM chassis parameter 'par_turn_signal_trailer_fault_reporting' contains "Short to GND" 3. Battery voltage is greater than 9V and smaller than 16V 4. Trailer Turn Lamp Right is active	blown fuse / fuse removed
71	520409	3	Trailer turn lamp left - Voltage above normal, or shorted to high source	conn X53, pin 9	F5	R2	Pin 760, Short to battery can be also active in case of stuck relay.	Connected load is always supplied. Left turn signals are flashing at twice the normal frequency	1. The wiring harness to the connected load is shorted to battery 2. Relay is stuck	1. Check the wiring harness to the connected load 2. Check relay	1. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "Back of cab" 2. The SAM chassis parameter 'par_turn_signal_trailer_fault_reporting' contains "Short to BAT" 3. Battery voltage is greater than 9V and smaller than 16V 4. Trailer Turn Lamp Left is inactive	> 9 V
71	520409	4	Trailer turn lamp left - Voltage below normal, or shorted to low source	conn X53, pin 9	F5	R2	Pin 760, Short to ground can be also active in case of stuck relay.	Connected load is always off. Left turn signals are flashing at twice the normal frequency	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	1. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "Back of cab" 2. The SAM chassis parameter 'par_turn_signal_trailer_fault_reporting' contains "Short to GND" 3. Battery voltage is greater than 9V and smaller than 16V 4. Trailer Turn Lamp Left is active	blown fuse / fuse removed

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	520501	3	Trailer ABS connector (7), IGN - Voltage above normal, or shorted to high source	conn X54, pin 1	F11	R6	Pin 743, Short to battery can be also active in case of stuck relay.	Connected load is 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	1. The SAM chassis parameter 'par_trailer_ABS_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Trailer ABS Connector (7), IGN is inactive	> 5.0 V
71	520501	4	Trailer ABS connector (7), IGN - Voltage below normal, or shorted to low source	conn X54, pin 1	F11	R6	Pin 743, 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	1. The SAM chassis parameter 'par_trailer_ABS_fault_reporting' contains "Short to GND" 2. Battery voltage is greater than 9V and smaller than 16V 3. Trailer ABS Connector (7), IGN is active	blown fuse / fuse removed
71	520602	3	Trailer marker lamps - Voltage above normal, or shorted to high source	conn X55, pin 2	F9	R5	Pin 755, Short to battery can be also active in case of stuck relay.	Connected loads are always supplied	1. The wiring harness to the connected load is shorted to battery 2. Relay is stuck	1. Check the wiring harness to the connected load 2. Check relay	1. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "Back of cab" 2. The SAM chassis parameter 'par_trailer_marker_lamps_fault_reporting' contains "Short to BAT" 3. Battery voltage is greater than 9V and smaller than 16V 4. Trailer Marker Lamps are inactive	> 9 V
71	520602	4	Trailer marker lamps - Voltage below normal, or shorted to low source	conn X55, pin 2	F9	R5	Pin 755, 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 is blown 3. Relay is stuck	1. Check the wiring harness to the connected loads 2. Check fuse 3. Check relay	1. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "Back of cab" 2. The SAM chassis parameter 'par_trailer_marker_lamps_fault_reporting' contains "Short to GND" 3. Battery voltage is greater than 9V and smaller than 16V 4. Trailer Marker Lamps are active	blown fuse / fuse removed

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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
71	520603	3	Trailer tail lamps - Voltage above normal, or shorted to high source	conn X55, pin 3	F13	R9	Pin 758, Short to battery can be also active in case of stuck relay.	Connected loads are always supplied	1. The wiring harness to the connected load is shorted to battery 2. Relay is stuck	1. Check the wiring harness to the connected load 2. Check relay	1. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "Back of cab" 2. The SAM chassis parameter 'par_trailer_tail_lamps_fault_reporting' contains "Short to BAT" 3. Battery voltage is greater than 9V and smaller than 16V 4. Trailer Tail Lamps are inactive	> 9 V
71	520603	4	Trailer tail lamps - Voltage below normal, or shorted to low source	conn X55, pin 3	F13	R9	Pin 758, 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 is blown 3. Relay is stuck	1. Check the wiring harness to the connected loads 2. Check fuse 3. Check relay	1. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "Back of cab" 2. The SAM chassis parameter 'par_trailer_tail_lamps_fault_reporting' contains "Short to GND" 3. Battery voltage is greater than 9V and smaller than 16V 4. Trailer Tail Lamps are active	blown fuse / fuse removed
71	520604	3	Trailer stop lamps - Voltage above normal, or shorted to high source	conn X55, pin 4	F12	R7	Pin 757, Short to battery can be also active in case of stuck relay.	Connected loads are always supplied	1. The wiring harness to the connected load is shorted to battery 2. Relay is stuck	1. Check the wiring harness to the connected load 2. Check relay	1. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "Back of cab" 2. The SAM chassis parameter 'par_trailer_stop_lamps_fault_reporting' contains "Short to BAT" 3. Battery voltage is greater than 9V and smaller than 16V 4. Trailer Stop Lamps are inactive	> 9 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
71	520604	4	Trailer stop lamps - Voltage below normal, or shorted to low source	conn X55, pin 4	F12	R7	Pin 757, 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 is blown 3. Relay is stuck	1. Check the wiring harness to the connected loads 2. Check fuse 3. Check relay	1. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "Back of cab" 2. The SAM chassis parameter 'par_trailer_stop_lamps_fault_reporting' contains "Short to GND" 3. Battery voltage is greater than 9V and smaller than 16V 4. Trailer Stop Lamps are active	blown fuse / fuse removed
71	520703	3	End of frame primary trailer power, IGN - Voltage above normal, or shorted to high source	conn X56, pin 3	-	-	Pin 725R	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 chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. Battery voltage is greater than 9V and smaller than 16V 4. End of Frame Primary Trailer Power IGN is inactive	> 4.2 V
71	520703	4	End of frame primary trailer power, IGN - Voltage below normal, or shorted to low source	conn X56, pin 3	-	-	Pin 725R, 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 chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. End of Frame Primary Trailer Power IGN is active	> 14.5 A

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	520703	5	End of frame primary trailer power, IGN - Current below normal, or open circuit	conn X56, pin 3	-	-	Pin 725R	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. SAM chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. Battery voltage is greater than 11.6V and smaller than 16V 4. Switch park brake switch from engaged to disengaged or vice-versa or switch ignition switch fom crank to ignition	> 4.2 V
71	520707	3	End of frame primary trailer turn lamps right - Voltage above normal, or shorted to high source	conn X56, pin 7	-	-	Pin 735	Connected loads are always supplied. Right turn signals are flashing at twice the normal frequency	The wiring harness to the connected loads is shorted to battery	Check the wiring harness to the connected loads	1. SAM chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. The SAM chassis parameter 'par_trailer_EOF_turn_signal_fault_reporting' contains "Short to BAT" 4. Battery voltage is greater than 9V and smaller than 16V 5. End of Frame Primary Trailer Turn Lamp Right is inactive	> 4.2 V
71	520707	4	End of frame primary trailer turn lamps right - Voltage below normal, or shorted to low source	conn X56, pin 7	-	-	Pin 735. 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 loads are always off. Left turn signals are flashing at twice the normal frequency	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. SAM chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. The SAM chassis parameter 'par_trailer_EOF_turn_signal_fault_reporting' contains "Short to GND" 4. End of Frame Primary Trailer Turn Lamps Right is active	> 14.5 A

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	520707	5	End of frame primary trailer turn lamps right - Current below normal, or open circuit	conn X56, pin 7	-	-	Pin 735	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	ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. The SAM chassis parameter 'par_trailer_EOF_turn_signal_fault_reporting' contains "Open Load" 4. Battery voltage is greater than 11.6V and smaller than 16V 5. Switch park brake switch from engaged to disengaged or vice-versa, or switch ignition switch fom crank to ignition, or activate the trailer turn lamps	> 4.2 V
71	520709	3	End of frame supplemental power - Voltage above normal, or shorted to high source	conn X56, pin 9	-	-	Pin 3143	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 chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_eof_supplemental_receptacle_config' is different than "not present" 3. Battery voltage is greater than 9V and smaller than 16V 4. End of frame Supplemental Power is inactive	> 4.2 V
71	520709	4	End of frame supplemental power - Voltage below normal, or shorted to low source	conn X56, pin 9	-	-	Pin 3143, 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 chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_eof_supplemental_receptacle_config' is different than "not present" 3. End of frame Supplemental Power is active	> 14.5 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
71	520709	5	End of frame supplemental power - Current below normal, or open circuit	conn X56, pin 9	-	-	Pin 3143	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 chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_eof_supplemental_receptacle_config' is different than "not present" 3. Battery voltage is greater than 11.6V and smaller than 16V 4. Switch park brake switch from engaged to disengaged or vice-versa, or switch ignition switch from crank to ignition	> 4.2 V
71	520710	3	End of frame primary trailer turn lamps left - Voltage above normal, or shorted to high source	conn X56, pin 10	-	-	Pin 734	Connected loads are always supplied. Left turn signals are flashing at twice the normal frequency	The wiring harness to the connected loads is shorted to battery	Check the wiring harness to the connected loads	1. SAM chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. The SAM chassis parameter 'par_trailer_EOF_turn_signal_fault_reporting' contains "Short to BAT" 4. Battery voltage is greater than 9V and smaller than 16V 5. End of Frame Primary Trailer Turn Lamp Left is inactive	> 4.2 V
71	520710	4	End of frame primary trailer turn lamps left - Voltage below normal, or shorted to low source	conn X56, pin 10	-	-	Pin 734. 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 loads are always off. Left turn signals are flashing at twice the normal frequency	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. SAM chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. The SAM chassis parameter 'par_trailer_EOF_turn_signal_fault_reporting' contains "Short to GND" 4. End of Frame Primary Trailer Turn Lamp Left is active	> 14.5 A

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	520710	5	End of frame primary trailer turn lamps left - Current below normal, or open circuit	conn X56, pin 10	-	-	Pin 734	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	ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. The SAM chassis parameter 'par_trailer_EOF_turn_signal_fault_reporting' contains "Open Load" 4. Battery voltage is greater than 11.6V and smaller than 16V 5. Switch park brake switch from engaged to disengaged or vice-versa, or switch ignition switch fom crank to ignition, or activate the trailer turn lamps	> 4.2 V
71	520713	3	End of frame primary trailer tail lamps - Voltage above normal, or shorted to high source	conn X56, pin 13	-	-	Pin 732	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. SAM chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. The SAM chassis parameter 'par_trailer_EOF_tail_lamps_fault_reporting' contains "Short to BAT" 4. Battery voltage is greater than 9V and smaller than 16V 5. End of Frame Primary Trailer Tail Lamp is inactive	> 4.2 V

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71	520713	4	End of frame primary trailer tail lamps - Voltage below normal, or shorted to low source	conn X56, pin 13	-	-	Pin 732, 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. SAM chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. The SAM chassis parameter 'par_trailer_EOF_tail_lamps_fault_reporting' contains "Short to GND" 4. End of Frame Primary Trailer Tail Lamp is active	> 14.5 A
71	520713	5	End of frame primary trailer tail lamps - Current below normal, or open circuit	conn X56, pin 13	-	-	Pin 732	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. SAM chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. The SAM chassis parameter 'par_trailer_EOF_tail_lamps_fault_reporting' contains "Open Load" 4. Battery voltage is greater than 11.6V and smaller than 16V 5. Switch park brake switch from engaged to disengaged or vice-versa or switch ignition switch fom crank to ignition	> 4.2 V

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71	520714	3	End of frame primary trailer stop lamps - Voltage above normal, or shorted to high source	conn X56, pin 14	-	-	Pin 731	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. SAM chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. The SAM chassis parameter 'par_trailer_EOF_stop_lamps_fault_reporting' contains "Short to BAT" 4. Battery voltage is greater than 9V and smaller than 16V 5. End of Frame Primary Trailer Stop Lamp is inactive	> 4.2 V
71	520714	4	End of frame primary trailer stop lamps - Voltage below normal, or shorted to low source	conn X56, pin 14	-	-	Pin 731, Automatic retry mechanism (3 retries, one after every 1s)	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. SAM chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. The SAM chassis parameter 'par_trailer_EOF_stop_lamps_fault_reporting' contains "Short to GND" 4. End of Frame Primary Trailer Stop Lamp is active	> 14.5 A

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	520714	5	End of frame primary trailer stop lamps - Current below normal, or open circuit	conn X56, pin 14	-	-	Pin 731	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	ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. The SAM chassis parameter 'par_trailer_EOF_stop_lamps_fault_reporting' contains "Open Load" 4. Battery voltage is greater than 11.6V and smaller than 16V 5. Switch park brake switch from engaged to disengaged or vice-versa or switch ignition switch fom crank to ignition, or deactivate End of Frame	> 4.2 V
71	520715	3	End of frame primary trailer marker lamps - Voltage above normal, or shorted to high source	conn X56, pin 15	-	-	Pin 729	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. SAM chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. The SAM chassis parameter 'par_trailer_EOF_marker_lamps_fault_reporting' contains "Short to BAT" 4. Battery voltage is greater than 9V and smaller than 16V 5. End of Frame Primary Trailer Marker Lamp is inactive	> 4.2 V

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	520715	4	End of frame primary trailer marker lamps - Voltage below normal, or shorted to low source	conn X56, pin 15	-	-	Pin 729, 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. SAM chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. The SAM chassis parameter 'par_trailer_EOF_marker_lamps_fault_reporting' contains "Short to GND" 4. End of Frame Primary Trailer Marker Lamp is active	> 14.5 A
71	520715	5	End of frame primary trailer marker lamps - Current below normal, or open circuit	conn X56, pin 15	-	-	Pin 729	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. SAM chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_trailer_primary_receptacle_config' contains "End of Frame" 3. The SAM chassis parameter 'par_trailer_EOF_marker_lamps_fault_reporting' contains "Open Load" 4. Battery voltage is greater than 11.6V and smaller than 16V 5. Switch park brake switch from engaged to disengaged or vice-versa or switch ignition switch fom crank to ignition	> 4.2 V
71	520801	3	Relay group 3 - Voltage above normal, or shorted to high source	conn X52, pin 6 conn X53, pin 3 conn X57, pin 1	F6, F7	R3	Common DTC for pins 26 (power feed EAPU/WIF module, IGN, X57/1), 3060 (power feed ABS/BS, IGN, X52/6) and 282 (rear view camera, IGN, X53/3). 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 3 is stuck	1. Check the wiring harness to the connected loads 2. Check Relay 3	1. Battery voltage is greater than 9V and smaller than 16V. 2. IGN_1 normal mode pin group (relay 3 and 6) is inactive	> 5 V

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	520801	4	Fuse group 7 - Voltage below normal, or shorted to low source	conn X53, pin 3 conn X57, pin 1	F7	R3	Common DTC for pins 26 (power feed EAPU/WIF module, IGN, X57/1) and 282 (rear view camera, IGN, X53/3). 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 7 is blown 3. The relay which supplies Fuse group 7 is stuck	1. Check the wiring harness to the connected loads 2. Check fuse 7 3. Check the relay which supplies Fuse group 7	1. SAM chassis ECU model is set to "highline" 2. The SAM chassis parameter 'par_water_in_fuel_rear_view_camera_fault_reporting' contains "Short to GND" 3. Battery voltage is greater than 9V and smaller than 16V. 4. IGN_1 normal mode pin group (relay 3 and 6) is active	blown fuse / fuse removed
71	520804	3	Air dryer, ACC - Voltage above normal, or shorted to high source	conn X57, pin 4	-	-	Pin 8	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 chassis parameter 'par_air_dryer_heater' is set to "present" 2. Battery voltage is greater than 9V and smaller than 16V 3. Air dryer is inactive	> 9 V
71	520804	4	Air dryer, ACC - Voltage below normal, or shorted to low source	conn X57, pin 4	-	-	Pin 8, 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 chassis parameter 'par_air_dryer_heater' is set to "present" 2. Air dryer is active	> 30 A (at Ubatt >= 12 V) > 40 A (at Ubatt < 12 V)
71	520815	3	Fuel water separator heater element - Voltage above normal, or shorted to high source	conn X57, pin 15	F2	R1	Pin 381, Short to battery can be also active in case of stuck relay.	Connected load is always supplied	1. The wiring harness to the connected load is shorted to battery 2. Relay is stuck	1. Check the wiring harness to the connected load 2. Check relay	1. The SAM chassis parameter 'par_fuel_water_seperator_heater_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Fuel water separator heater element is inactive	> 5 V
71	520815	4	Fuel water separator heater element - Voltage below normal, or shorted to low source	conn X57, pin 15	F2	R1	Pin 381, 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	1. The SAM chassis parameter 'par_fuel_water_seperator_heater_fault_reporting' contains "Short to GND" 2. Battery voltage is greater than 9V and smaller than 16V 3. Fuel water separator heater element is active	blown fuse / fuse removed

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	520901	3	Turn right rear lower - Voltage above normal, or shorted to high source	conn X58, pin 1	-	-	Pin 507	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 chassis parameter 'par_turn_signal_rear_lower_fault_reporting' contains "Short to BAT" 2. The SAM chassis parameter 'par_combo_stop_turn_lamps' is set to "separate" 3. Battery voltage is greater than 9V and smaller than 16V 4. Turn Right Rear, lower is inactive	> 9 V
71	520901	4	Turn right rear lower - Voltage below normal, or shorted to low source	conn X58, pin 1	-	-	Pin 507. 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	The wiring harness to connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM chassis parameter 'par_turn_signal_rear_lower_fault_reporting' contains "Short to GND" 2. The SAM chassis parameter 'par_combo_stop_turn_lamps' is set to "separate" 3. Turn Right Rear, lower is active	> 14.8 A (at Ubatt >= 12 V) > 35 A (at Ubatt < 12 V)
71	520901	5	Turn right rear lower - Current below normal, or open circuit	conn X58, pin 1	-	-	Pin 507	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 chassis parameter 'par_turn_signal_rear_lower_fault_reporting' contains "Open Load" 2. The SAM chassis parameter 'par_combo_stop_turn_lamps' is set to "separate" 3. Battery voltage is greater than 11.6V and smaller than 16V 4. Switch park brake switch from engaged to disengaged or vice-versa, or switch ignition switch fom crank to ignition, or activate Turn Right Rear, lower	> 12.5 V (at Ubatt = 14 V)

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	520903	3	Tail lamp right - Voltage above normal, or shorted to high source	conn X58, pin 3	-	-	Pin 496, tail lamp right	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 chassis parameter 'par_tail_lamp_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Tail Lamp, right is inactive	> 4.2 V
71	520903	4	Tail lamp right - Voltage below normal, or shorted to low source	conn X58, pin 3	-	-	Pin 496, tail lamp right, 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 chassis parameter 'par_tail_lamp_fault_reporting' contains "Short to GND" 2. Tail Lamp, right is active	> 14.5 A
71	520903	5	Tail lamp right - Current below normal, or open circuit	conn X58, pin 3	-	-	Pin 496, tail lamp right	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 chassis parameter 'par_tail_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 fom crank to ignition	Pin > 12.5 V at Ubatt=14 V
71	520910	3	Turn left rear lower - Voltage above normal, or shorted to high source	conn X58, pin 10	-	-	Pin 502	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 chassis parameter 'par_turn_signal_rear_lower_fault_reporting' contains "Short to BAT" 2. The SAM chassis parameter 'par_combo_stop_turn_lamps' is set to "separate" 3. Battery voltage is greater than 9V and smaller than 16V 4. Turn Left Rear, lower is inactive	> 9 V

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	520910	4	Turn left rear lower - Voltage below normal, or shorted to low source	conn X58, pin 10	-	-	Pin 502. 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	The wiring harness to connected load is shorted to ground	Check the wiring harness to the connected load	1. The SAM chassis parameter 'par_turn_signal_rear_lower_fault_reporting' contains "Short to GND" 2. The SAM chassis parameter 'par_combo_stop_turn_lamps' is set to "separate" 3. Turn Left Rear, lower is active	> 14.8 A (at Ubatt >= 12 V) > 35 A (at Ubatt < 12 V)
71	520910	5	Turn left rear lower - Current below normal, or open circuit	conn X58, pin 10	-	-	Pin 502	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 chassis parameter 'par_turn_signal_rear_lower_fault_reporting' contains "Open Load" 2. The SAM chassis parameter 'par_combostop_turn_lamps' is set to "separate" 3. Battery voltage is greater than 11.6V and smaller than 16V 4. Switch park brake switch from engaged to disengaged or vice-versa, or switch ignition switch fom crank to ignition, or activate Turn Left Rear, lower	> 12.5 V (at Ubatt = 14 V)
71	520912	3	License plate lamp - Voltage above normal, or shorted to high source	conn X58, pin 12	-	-	Pin 441, license plate lamp	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 chassis parameter 'par_license_plate_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 2. License plate lamp is inactive	> 4.2 V
71	520912	4	License plate lamp - Voltage below normal, or shorted to low source	conn X58, pin 12	-	-	Pin 441, license plate lamp. 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 chassis parameter 'par_license_plate_fault_reporting' contains "Short to GND" 2. The license plate lamp is active	> 14.5 A

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	520912	5	License plate lamp - Current below normal, or open circuit	conn X58, pin 12	-	-	Pin 441, license plate lamp	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 chassis parameter 'par_license_plate_fault_reporting' contains "Open Load" 2. Battery voltage is greater than 13.5V and smaller than 15.5V 3. Switch park brake switch from engaged to disengaged or vice-versa or switch ignition switch fom crank to ignition	Pin > 12.5 V at Ubatt=14 V
71	520916	3	Marker lamp side left - Voltage above normal, or shorted to high source	conn X53, pin 1 conn X58, pin 16	-	-	Pin 477, marker lamp side left	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 chassis parameter 'par_marker_lamp_SIDE_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Marker lamp side left is inactive	> 4.2 V
71	520916	4	Marker lamp side left - Voltage below normal, or shorted to low source	conn X53, pin 1 conn X58, pin 16	-	-	Pin 477, marker lamp side left. Automatic retry mechanism (5 retries, one after every 5s). The failure is not detected while the SAM Chassis 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 chassis parameter 'par_marker_lamp_SIDE_fault_reporting' contains "Short to GND" 2. Marker lamp side left is active	> 14.5 A
71	520916	5	Marker lamp side left - Current below normal, or open circuit	conn X53, pin 1 conn X58, pin 16	-	-	Pin 477, marker lamp side left	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 chassis parameter 'par_marker_lamp_SIDE_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 fom crank to ignition	Pin > 12.5 V at Ubatt=14 V

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	520918	3	Tail lamp left - Voltage above normal, or shorted to high source	conn X58, pin 18	-	-	Pin 495, tail lamp left	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 chassis parameter 'par_tail_lamp_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Tail Lamp, left is inactive	> 4.2 V
71	520918	4	Tail lamp left - Voltage below normal, or shorted to low source	conn X58, pin 18	-	-	Pin 495, tail lamp left, 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 chassis parameter 'par_tail_lamp_fault_reporting' contains "Short to GND" 2. Tail Lamp, left is active	> 14.5 A
71	520918	5	Tail lamp left - Current below normal, or open circuit	conn X58, pin 18	-	-	Pin 495, tail lamp left	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 chassis parameter 'par_tail_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 fom crank to ignition	Pin > 12.5 V at Ubatt=14 V
71	520919	3	Backup lamp - Voltage above normal, or shorted to high source	conn X58, pin 19	-	-	Pin 393	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 chassis parameter 'par_backup_lamp_config' is set to "present" 2. The SAM chassis parameter 'par_backup_lamp_fault_reporting' contains "Short to BAT" 3. Battery voltage is greater than 9V and smaller than 16V 4. Backup lamp is inactive	> 9 V
71	520919	4	Backup lamp - Voltage below normal, or shorted to low source	conn X58, pin 19	-	-	Pin 393, 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 chassis parameter 'par_backup_lamp_config' is set to "present" 2. The SAM chassis parameter 'par_backup_lamp_fault_reporting' contains "Short to GND" 3. Backup lamp is active	> 23.2 A (at Ubatt >= 12 V) > 35 A (at Ubatt < 12 V)

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	520919	5	Backup lamp - Current below normal, or open circuit	conn X58, pin 19	-	-	Pin 393	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 chassis parameter 'par_backup_lamp_config' is set to "present" 2. The SAM chassis parameter 'par_backup_lamp_fault_reporting' contains "Open Load" 3. Battery voltage is greater than 13.5V 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 deactivate backup lamp	> 12.5 V (at Ubatt = 14 V)
71	520920	3	Stop lamp right - Voltage above normal, or shorted to high source	conn X58, pin 20	-	-	Pin 491, Ensure enough air pressure, low air pressure switch status must be off. If necessary start the engine to increase the air pressure.	Connected load is always supplied. If stop lamps are used as turn signals, 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 chassis parameter 'par_stop_lamp_lower_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Stop Lamp, rear right lower is inactive	> 9 V
71	520920	4	Stop lamp right - Voltage below normal, or shorted to low source	conn X58, pin 20	-	-	Pin 491. Automatic retry mechanism: 3 retries, one after every 1s (in case of output activation via IO Control or service brake switch) OR 5 retries, one after every "rising edge" (in case of manual output activation via Turn switch or SAM Chassis is in SW emergency mode)	Connected load is always off. If stop lamps are used as turn signals, 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 chassis parameter 'par_stop_lamp_lower_fault_reporting' contains "Short to GND" 2. Stop Lamp, rear right lower is active	> 14.8 A (at Ubatt >= 12 V) > 35 A (at Ubatt < 12 V)

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	520920	5	Stop lamp right - Current below normal, or open circuit	conn X58, pin 20	-	-	Pin 491	No load is connected If stop lamps are used as turn signals, 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 chassis parameter 'par_stop_lamp_lower_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 fom crank to ignition, or deactivate stop lamp, rear right lower	> 12.5 V (at Ubatt = 14 V)
71	520921	3	Stop lamp left - Voltage above normal, or shorted to high source	conn X58, pin 21	-	-	Pin 489, Ensure enough air pressure, low air pressure switch status must be off. If necessary start the engine to increase air pressure.	Connected load is always supplied. If stop lamps are used as turn signals, 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 chassis parameter 'par_stop_lamp_lower_fault_reporting' contains "Short to BAT" 2. Battery voltage is greater than 9V and smaller than 16V 3. Stop Lamp, rear left lower is inactive	> 9 V
71	520921	4	Stop lamp left - Voltage below normal, or shorted to low source	conn X58, pin 21	-	-	Pin 489. Automatic retry mechanism: 3 retries, one after every 1s (in case of output activation via IO Control or service brake switch) OR 5 retries, one after every "rising edge" (in case of manual output activation via Turn switch or SAM Chassis is in SW emergency mode)	Connected load is always off. If stop lamps are used as turn signals, 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 chassis parameter 'par_stop_lamp_lower_fault_reporting' contains "Short to GND" 2. Stop Lamp, rear left lower is active	> 14.8 A (at Ubatt >= 12 V) > 35 A (at Ubatt < 12 V)

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	520921	5	Stop lamp left - Current below normal, or open circuit	conn X58, pin 21	-	-	Pin 489	No load is connected If stop lamps are used as turn signals, 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 chassis parameter 'par_stop_lamp_lower_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 fom crank to ignition, or deactivate stop lamp rear left lower	> 12.5 V (at Ubatt = 14 V)
71	521001	3	Backup switch - Voltage above normal, or shorted to high source	conn X59, pin 1 conn X59, pin 3	-	-	Common DTC for pins 762 (backup switch, IGN, X59/1) and 763 (backup switch, return, X59/3), CAN message Transmission Reverse Direction Switch Status changes to "ERROR"	Backup switch status does not reflect the status of the backup switch	The wiring harness to the backup switch is shorted to battery	Check the wiring harness to backup switch	1. The SAM chassis parameter 'par_backup_switch_available' is set to "yes" 2. Battery voltage is greater than 9V and smaller than 16V	> 4.2 V
71	521001	4	Backup switch - Voltage below normal, or shorted to low source	conn X59, pin 1	-	-	Pin 762, Automatic retry mechanism (5 retries, one after every 5s). After the fault is stored (active) the pin is solid off, reactivation will be triggered by any ignition switch change. CAN message Transmission Reverse Direction Switch Status changes to "ERROR".	Backup switch status does not reflect the status of the backup switch	The wiring harness to the backup switch is shorted to ground	Check the wiring harness to the backup switch	1. The SAM chassis parameter 'par_backup_switch_available' is set to "yes" 2. Ignition switch status does not equal off 3. Backup switch supply is active	> 14.5 A

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	521002	3	Transmission neutral switch - Voltage above normal, or shorted to high source	conn X59, pin 18 conn X59, pin 2	-	-	Common DTC for pins 768 (transmission neutral switch, return, X59/18) and 769 (transmission neutral switch, IGN, X59/2), CAN message Transmission Neutral Switch Status changes to "ERROR"	Transmission neutral switch status does not reflect the status of the transmission neutral switch	The wiring harness to the transmission neutral switch is shorted to battery	Check the wiring harness to transmission neutral switch	1. The SAM chassis parameter 'par_neutral_switch_available' is set to "yes" 2. Battery voltage is greater than 9V and smaller than 16V	> 4.2 V
71	521002	4	Transmission neutral switch - Voltage below normal, or shorted to low source	conn X59, pin 2	-	-	Pin 769, Automatic retry mechanism (5 retries, one after every 5s). After the fault is stored (active) the pin is solid off, reactivation will be triggered by any ignition switch change. CAN message Transmission Neutral Switch Status changes to "ERROR".	Transmission neutral switch status does not reflect the status of the transmission neutral switch	The wiring harness to the transmission neutral switch is shorted to ground	Check the wiring harness to the transmission neutral switch	1. The SAM chassis parameter 'par_neutral_switch_available' is set to "yes" 2. Transmission neutral switch supply is active	> 14.5 A
71	524033	31	Lost communication with SAM_CAB	conn X51, pin 2 conn X51, pin 1	-	-	CAN bus is connected to pin 197 (Cabin CAN High, X51/2) and 198 (Cabin CAN Low, X51/1) ; relevant for this timeout are SAM_CAB_A1, SAM_CAB_A2, SAM_CAB_A3, SAM_CAB_A4	SAM is operating in Emergency Mode Marker lamps and tail lamps are active, stop lamps and trailer tail lamps are flashing 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_CAB_A1 OR SAM_CAB_A2 OR SAM_CAB_A3 OR SAM_CAB_A4 messages not received for 10 times

SAM Chassis CAN Fault Codes												
SA	SPN	FMI	Error text	Connector, Pin	Fuse	Relay	Notes	Customer Perception / Symptom	Possible Causes	Repair Action	Enable Conditions	Mature Threshold
71	524037	31	Lost communication with CGW	conn X51, pin 2 conn X51, pin 1	-	-	CAN bus is connected to pin 197 (Cabin CAN High, X51/2) and 198 (Cabin CAN Low, X51/1) ; 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
71	524049	31	Lost communication with MSF	conn X51, pin 2 conn X51, pin 1	-	-	CAN bus is connected to pin 197 (Cabin CAN High, X51/2) and 198 (Cabin CAN Low, X51/1) ; relevant for this timeout is MSF_A2	MSF switched outputs cannot be activated/de activated	1. Cabin CAN wiring harness between SAM CHAS and MSF is open 2. MSF 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_A2 message not received for 10 times