

Code	Fault description	System reaction	fault-recovery condition (RESET=battery main switch OFF)	probable source of failure
2	Short circuit to ground at output stage to Y2 (Valve Splitter; DD: high, OD: low)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
3	Short circuit to ground at output stage to Y3 (Valve Splitter; DD: low, OD: high)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
4	Short circuit to ground at output stage to Y4 (Valve Select)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
5	Short circuit to ground at output stage to Y5 (Valve Select)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
6	Short circuit to ground at output stage to Y6 (Valve Shift)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
7	Short circuit to ground at output stage to Y7 (Valve Shift)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
8	Short circuit to ground at output stage to Y8 (Valve Range)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
9	Short circuit to ground at output stage to Y9 (Valve Range)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator

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10	Short circuit to ground at output stage to Y10 (Main valve)	Driving: No gearshifting possible! No neutral shifting possible! Selected gear remains engaged! Vehicle start permitted if engaged gear <= lowest gear in high range group is engaged. After ignition on, system not available	After RESET and no short circuit to ground	shift actuator
11	Short circuit to ground at output stage to warning buzzer and warning lamp	Warning buzzer and warning lamp permanently activated	After RESET and no short circuit to ground	vehicle el. system
12	Short circuit to ground at output stage to reverse light relay (E-Module)	No reverse light activation possible. No further system restrictions	After RESET and no short circuit to ground	vehicle el. system
15	Short circuit to ground at output stage to AD 24	Output cannot be activated	After RESET and no short circuit to ground	vehicle el. system
17	Short circuit to ground at output stage to Y1 (inertia brake valve)	Driving: Increased shifting time for upshifts. Upshifts blocked, when input target speed is below engine idle speed. Stationary: Increased self adjustment time. Increased shifting time when shifting out of neutral.	After RESET and no short circuit to ground	shift actuator
18	Short circuit to ground at output stage to Y17 (valve clutch disengage slow)	Decreased comfort when maneuvering and starting off.	After RESET and no short circuit to ground	shift actuator / clutch actuator
19	Short circuit to ground at output stage to Y15 (valve clutch engage slow)	Decreased comfort when maneuvering and starting off.	After RESET and no short circuit to ground	shift actuator / clutch actuator
20	Short circuit to ground at output stage to Y16 (valve clutch disengage fast)	Increased shifting time. Decreased comfort when maneuvering and starting off.	After RESET and no short circuit to ground	shift actuator / clutch actuator
21	Short circuit to ground at output stage to Y14 (valve clutch engage fast)	Increased shifting time. Decreased comfort when maneuvering and starting off.	After RESET and no short circuit to ground	shift actuator / clutch actuator

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22	Short circuit to ground at output ADVP	No display. Warning buzzer and warning lamp not available.	after RESET, if the failure will not be sensed	vehicle electrical system
25	Short circuit to ground at output SD to display	display flashing "EE". No system restrictions.	No short circuit to ground or after RESET.	vehicle el. system
27	Error on "engine configuration message" (engine configuration)	Reduced functionality for automatic mode and start gear calculation, if deviation of substitute parameters and real values is high. Target speed for downshifting can be reduced. Quality of clutch disengagement for stopping can be reduced.	After receiving a correct message or after RESET.	FMR
31	Error on "Actual engine retarder - percent torque" signal (ERC1_ER)	No calculation of driving resistance possible. No automatic calculation of start off gear. When coming to standstill medium start off gear will be shifted. No other functional restrictions. No information about engine brake torque. If exhaust brake is active, shifting quality at start of shifting may be poor. Engine brake is considered not active.	Signal available or after RESET.	--> "specials"
34	Interruption at output stage to Y2 (Valve Splitter)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
35	Interruption at output stage to Y3 (Valve Splitter)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
36	Interruption at output stage to Y4 (Valve Select)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
37	Interruption at output stage to Y5 (Valve Select)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
38	Interruption at output stage to Y6 (Valve Shift)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator

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39	Interruption at output stage to Y7 (Valve Shift)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
40	Interruption at output stage to Y8(Valve Range)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
41	Interruption at output stage to Y9 (Valve Range)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
42	Interruption at output stage to Y10 (Main valve)	No gearshifting possible! No neutral shifting possible! Selected gear remains engaged; Vehicle start permitted if gear <= lowest gear in high range group is engaged. After ignition on, system not available	No interruption and output not activated or after RESET.	shift actuator
44	Interruption at output stage to reverse light relay (E-Module)	No reverse light activation possible. No further system restrictions	No interruption and output not activated or after RESET.	vehicle electrical system
49	Interruption at output stage to Y1 (inertia brake valve)	Driving: Upshifts during driving are controlled like downshifts. Input speed will be synchronized by engine speed. Upshifts blocked, when input target speed is below engine idle speed. Increased shifting time. Stationary: Increased self adjustment time. Increased shifting time when shifting out of neutral.	No interruption and output not activated or after RESET.	shift actuator
50	Interruption at output stage valve Y17 (clutch disengage slow)	Decreased comfort when maneuvering and starting off.	No interruption and output not activated or after RESET.	shift actuator / clutch actuator
51	Interruption at output stage valve Y15 (clutch engage slow)	Decreased comfort when maneuvering and starting off.	No interruption and output not activated or after RESET.	shift actuator / clutch actuator
52	Interruption at output stage valve Y16 (clutch disengage fast)	Increased shifting time. Decreased comfort when maneuvering and starting off.	No interruption and output not activated or after RESET.	shift actuator / clutch actuator

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53	Interruption at output stage to large Y14 (clutch engage fast)	Increased shifting time. Decreased comfort when maneuvering and starting off.	No interruption and output not activated or after RESET.	shift actuator / clutch actuator
54	Interruption at output ADVP	1. After ignition ON: No display function, warning buzzer and warning lamp not available. Starting off not possible. 2. During operation: Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	vehicle el. system
66	Short circuit to positive at output stage to Y2 (Valve Splitter)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
67	Short circuit to positive at output stage to Y3 (Valve Splitter)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
68	Short circuit to positive at output stage to Y4 (Valve Select)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
69	Short circuit to positive at output stage to Y5 (Valve Select)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
70	Short circuit to positive at output stage to Y6 (Valve Shift)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
71	Short circuit to positive at output stage to Y7 (Valve Shift)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator

72	Short circuit to positive at output stage to Y8 (Valve range low)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
73	Short circuit to positive at output stage to Y9 (Valve range high)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
74	Short circuit to positive at output stage to Y10 (Main valve)	Driving: Gearshifting of all gears possible. Stationary: All starting gears can be engaged. Driving with start off gear possible.	No short circuit to positive and output not activated or after RESET.	shift actuator
75	Short circuit to positive at output stage to warning buzzer (E-Module)	Warning buzzer and warning lamp not available.	After RESET and no short circuit to positive.	vehicle electrical system
76	Short circuit to positive at output stage to AD 23 = relay for reverse driving lamp (E-Module)	Reverse driving lamp permanently engaged. No further functional restrictions.	After RESET and no short circuit to positive.	vehicle electrical system
79	Short circuit to positive at output stage to AD 24	Output permanently active. No further functional restrictions.	After RESET and no short circuit to positive.	vehicle electrical system
81	Short circuit to positive at output stage to Y1 (inertia brake valve)	Driving: Gearshifting blocked. Stationary: Shift of start off gears possible. Main valve will be only activated during shifting, if clutch is opened. Start off possible.	No short circuit to positive and output not activated or after RESET.	shift actuator
82	Short circuit to positive at output stage to valve Y17 (clutch disengage slow)	Gearshifting generally blocked, system not available. Driving and gear engaged: Attempt to keep clutch engaged (prevention with engagement valves). Stationary: Engagement valves are switched off, automatic neutral shifting when clutch is disengaged. Continuous driving not possible.	no short circuit to positive or after RESET.	shift actuator / clutch actuator
83	Short circuit to positive at output stage to valve Y15 (clutch engage slow)	Gearshifting generally blocked, system not available. Driving: Required clutch position maintained via disengagement valve. Stationary: Automatic neutral shifting after a certain time.	no short circuit to positive or after RESET.	shift actuator / clutch actuator

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84	Short circuit to positive at output stage to valve Y16 (clutch disengage fast)	Gearshifting generally blocked, system not available. Driving and gear engaged: Attempt to keep clutch engaged (prevention with engagement valves). Stationary: Engagement valves are switched off, automatic neutral shifting when clutch is disengaged.	no short circuit to positive or after RESET.	shift actuator / clutch actuator
85	Short circuit to positive at output stage to valve Y14 (clutch engage fast)	Gearshifting generally blocked, system not available. Driving: Required clutch position maintained via disengagement valve. Stationary: Automatic neutral shifting after a certain time.	no short circuit to positive or after RESET.	shift actuator / clutch actuator
86	Short circuit to positive at output ADVP	1. After ignition off/on Failure will be detected during initialization. E-Modul does not switch off. Display can not be switched off. No restrictions on system availability. After ignition off, display is flashing EE. 2. During operation No restrictions on system availability.	After RESET	vehicle electrical system
89	Short circuit to positive at output SD to display	display flashing "EE". No system restrictions.	no short circuit to positive or after RESET.	vehicle electrical system
90	Communication error between controller 1 and controller 2 (ECU failure)	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator
92	Error on "ABS active" signal (EBC1)	No calculation of driving resistance possible. No automatic calculation of start off gear. When coming to standstill medium start off gear will be shifted. No other functional restrictions.	Signal available or after RESET.	ABS/ASR
93	Error on "ASR engine control active" signal (EBC1)	No calculation of driving resistance possible. No automatic calculation of start off gear. When coming to standstill medium start off gear will be shifted. No other functional restrictions.	Signal available or after RESET.	ABS/ASR
94	Error on "ASR brake control active" signal (EBC1)	No calculation of driving resistance possible. No automatic calculation of start off gear. When coming to standstill medium start off gear will be shifted. No other functional restrictions.	Signal available or after RESET.	ABS/ASR
95	Error on "Cruise control active" signal (CCVS)	No other functional restrictions	Signal available or after RESET.	
96	Error on "Cruise control set speed" (CCVS)	No other functional restrictions, gear hunting in cruise control possible	Signal available or after RESET.	

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97	Error on "Engine speed" signal	Driving: Time based control of clutch during shifting. Decreased clutch comfort after shifting. Clutch does not open below fixed value (No clutch opening according coasting condition) Engine speed governor during upshift does not work. Stationary: No special manoeuvring operation possible. Time based control of clutch during starting off. Decreased clutch comfort of manoeuvring and starting.	1.Signal available and engine speed < plausible value. 2.After Reset	FMR
98	Error on transmission input speed signal	Driving: Increased shifting time. During upshifting and downshifting clutch will be partially closed when t/m in neutral to substitute input speed by engine speed. If gear is engaged, input speed is substituted by output speed. Stationary: Increased shifting time. Decreased clutch comfort in manoeuvring and starting	Input speed plausible or after RESET	shift actuator
99	Error on output speed signal 1	Output speed signal will be calculated depending on system application from redundant output speed information. Redundant speed information will be taken depending on application from vehicle speed signal via CAN OR output speed signal from CAN tachograph. Manual shifting of all gears possible. Shifting quality could be decreased because of less dynamik response of CAN-information.	Output speed plausible or after RESET	T/m output sensor / cable
101	Error on both output speed signals	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	T/m output sensor / cable
102	Plausibility error between transmission input speed and out-put speed	Driving: Gearshifting blocked during driving including neutral shift attempt. Stationary: Start off gears can be engaged. Driving with start off gear possible.	After RESET	
104	High voltage (Vehicle electrical system voltage too high)	No system restrictions while driving.	circuit voltage within valid range or after RESET.	vehicle electrical system
105	Low voltage (Vehicle electrical system voltage too low)	Driving: Gearshifting blocked. Stationary: Gearshifting blocked. If gear is engaged and driver switches off ignition, attempt to shift to neutral.	circuit voltage within valid range or after RESET.	vehicle electrical system
107	Stabilised voltage supply at output AU (clutch sensor supply) out of valid range	Driving: Clutch is disengaged and engaged by time control. Stationary: Manoeuvring not possible. If start does not occur within certain time, transmission is automatically shifted to neutral. New start off gear must be engaged by selector lever. Decreased clutch comfort during start off.	Voltage at AU within valid range and RESET	shift actuator

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108	Error in selector lever or tip lever	General function (also without failure active): After ignition off/on , a gear can be only shifted, if rotary switch once has been in neutral position. Failure reaction is depending on driving situation and on gear engaged. 1.Failure on tip lever:-> No shifting possible. At standstill, start off gear selected by rotary switch will be engaged. Driving with selected start off gear possible (forward and reverse). 2.Failure on rotary switch: If a gear is engaged during driving, no gear shifting is possible. At standstill start off gear according last known (stored) Driving with selected start off gear possible. If at standstill neutral is engaged, no gearshifting is possible -> system not available. After ignition off T/m will generally shift to Neutral.	1. Valid shift lever neutral signal (rotary switch at neutral) 2. After RESET	Gear selector
109	Plausibility error between crane cabine mode and main cabine mode	System available only from main cabine	After RESET and plausible signals	vehicle electrical system
110	ZF CAN timeout	1. After ignition off/on: Failure code will be indicated automatically on display alternating with gear information. System not available. 2. During operation: No gearchange possible. When coming to standstill, last selected (via rotary switch) startoff gear will be automatically engaged. Continuous driving only with startoff gear possible. If reverse gear has been engaged, t/m will automatically shifted to neutral. No shift lever information. Failure code will be indicated automatically on display alternating with gear information.	After receiving a correct message or after RESET.	
117	Error in clutch self-adjustment process	System not available.	After RESET	
118	Clutch does not disengage	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	Clutch / clutch actuator
119	Clutch does not engage / does not transmit engine torque	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	Clutch / clutch actuator
120	Mechanical failure of small disengagement clutch valve	Function taken on by redundant valve.Decreased clutch comfort	After RESET	clutch actuator

121	Mechanical failure of large disengagement clutch valve	Function taken on by redundant valve.Decreased clutch comfort	After RESET	clutch actuator
122	Mechanical failure of small engagement clutch valve	Function taken on by redundant valve.Decreased clutch comfort	After RESET	clutch actuator
123	Mechanical failure of large engagement clutch valve	Function taken on by redundant valve.Decreased clutch comfort	After RESET	clutch actuator
124	Error on clutch travel signal	Driving: Clutch is disengaged and engaged by time control. Stationary: Manoeuvring not possible. If start does not occur within certain time, transmission is automatically shifted to neutral. New start off gear must be engaged by selector lever. Decreased clutch comfort during start off.	After RESET and plausible voltage signal	clutch actuator
125	Error on pressure reduction valve (air pressure too high)	No system restrictions	1.If pressure level is lower than threshold. 2.After RESET	shift actuator
126	Error on pressure sensor signal	No system restrictions on availability, if external air supply is sufficient. No air pressure indication AL on display in case, air pressure is not sufficient. Self adjustment of transmission and clutch is done time based and not related to the sensor signal. Time for adjustment could be longer.	If voltage level is within plausible range or after RESET.	shift actuator
127	Error on ECU temperature sensor signal	No system restrictions on availability.	If voltage level is within plausible range or after RESET.	shift actuator
128	Error on oil temperature sensor signal	No system restrictions on availability. Shift monitoring time will be depending on ECU temperature signal.	If voltage level is within plausible range or after RESET.	shift actuator
129	No shift sensor signal (Short circuit to positive)	Driving: Gearshifting blocked. Only shifting out of neutral possible. Stationary: Engagement of starting gears possible. Change of starting gears possible.	After RESET	shift actuator
130	No shift sensor signal (Short circuit to ground)	Driving: Gearshifting blocked. Only shifting out of neutral possible. Stationary: Engagement of starting gears possible. Change of starting gears possible.	After RESET	shift actuator

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131	No shift sensor signal (Interruption)	Driving: Gearshifting blocked. Only shifting out of neutral possible. Stationary: Engagement of starting gears possible. Change of starting gears possible.	After RESET	shift actuator
132	Self adjustment error of shift sensor	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator / transmission
133	No gate select sensor signal (Short circuit to positive)	Driving: Only forward gears can be selected, which are allocated in opposite shift-position of the reverse gear. Stationary: All allowed starting gears can be switched, whose positions are allocated in opposite shift-position of the reverse gear. No reverse gear shiftable.	After RESET	shift actuator
134	No gate select sensor signal (Short circuit to ground)	Driving: Only forward gears can be selected, which are allocated in opposite shift-position of the reverse gear. Stationary: All allowed starting gears can be switched, whose positions are allocated in opposite shift-position of the reverse gear. No reverse gear shiftable.	After RESET	shift actuator
135	No gate select sensor signal (Interruption)	Driving: Only forward gears can be selected, which are allocated in opposite shift-position of the reverse gear. Stationary: All allowed starting gears can be switched, whose positions are allocated in opposite shift-position of the reverse gear. No reverse gear shiftable.	After RESET	shift actuator
136	Gate select sensor self adjustment error	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator / transmission
137	No range change group (GP) sensor signal (Short circuit to positive)	Driving: Range group shift during driving blocked. Only gears in engaged range group can be changed. Stationary: All start off gears can be engaged.	After RESET	shift actuator
138	No range change group (GP) sensor signal (Short circuit to ground)	Driving: Range group shift during driving blocked. Only gears in engaged range group can be changed. Only gears in engaged range group can be shifted. Stationary: All start off gears can be engaged.	After RESET	shift actuator
139	No range change group (GP) sensor signal (Interruption)	Driving: Range group shift during driving blocked. Only gears in engaged range group can be changed. Only gears in engaged range group can be shifted. Stationary: All start off gears can be engaged.	After RESET	shift actuator

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140	Self adjustment error of range change group sensor in position fast	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator / transmission
141	No splitter group (GV) sensor signal (Short circuit to positive)	Shifting of splitter group blocked. Further driving only possible with last selected splitter group position. If desired gear is not shiftable, next higher gear will be engaged.	After RESET	shift actuator
142	No splitter group (GV) sensor signal (Short circuit to ground)	Shifting of splitter group blocked. Further driving only possible with last selected splitter group position. If desired gear is not shiftable, next higher gear will be engaged.	After RESET	shift actuator
143	No splitter group (GV) sensor signal (Interruption)	Shifting of splitter group blocked. Further driving only possible with last selected splitter group position. If desired gear is not shiftable, next higher gear will be engaged.	After RESET	shift actuator
144	Splitter group (GV) sensor self adjustment error	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	shift actuator / transmission
145	Range change group (GP) disengagement error	Driving: When shifting from low range group to high group, the highest gear in low range group will be shifted. When shifting from high range group to low group, the lowest gear in high range group will be shifted. Stationary: If it is not possible to select low range group, the lowest gear in high range group is selected as starting gear. New attempt to shift range group is allowed under all driving conditions. No reverse gear in high range group possible.	1.After successful range change group shift 2.After RESET	low air press. / shift actuator / transmission
146	Changeover error during range change group (GP) shifting	Driving and stationary: If selected range group could not be engaged, following gear will be shifted: When shifting from low range group to high group, the highest gear in low range group will be shifted. When shifting from high range group to low group, the lowest gear in high range group will be shifted. Stationary: If it is not possible to select low range group, the lowest gear in high range group is selected as starting gear.	1.After successful range change group shift 2.After RESET	shift actuator / transmission
147	Range change group (GP) does not engage	Driving and stationary: If selected gear could not be engaged, previous range position will be selected. If engagement into old range position failed, failure will be set. T/m shifts to neutral.	1.After successful range change group shift 2.After RESET	low air press. / shift actuator / transmission

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148	Splitter (GV) does not disengage	If failure occurs, t/m shifts into next upper gear. Following gear restrictions are valid: The highest gear which can be selected, is the highest gear in last engaged splitterposition. The lowest gear which can be selected is the lowest gear in last engaged splitterposition.	1.After successful splitter group shift 2.After RESET	low air press. / shift actuator / transmission
149	Change over error during splitter shifting	If failure occurs, t/m shifts into next upper gear. Following gear restrictions are valid: The highest gear which can be selected, is the highest gear in last engaged splitterposition. The lowest gear which can be selected is the lowest gear in last engaged splitterposition.	1.After successful splitter group shift 2.After RESET	shift actuator / transmission
150	Splitter (GV) does not engage	System not available.	1.After successful splitter group shift 2.After RESET	low air press. / shift actuator / transmission
151	Selector cylinder does not disengage	Driving: When failure occurs during shifting, t/m shifts back into the last gear. If last gear is not shiftable because of overspeed condition, the next possible target gear, which is next to last gear will be shifted. When highest shiftable gear could not be shifted because of overspeed condition, then t/m shifts to neutral. Stationary: If target select position could not be engaged, t/m shifts into neutral. New shifting of start off gear must be initiated by selector switch.	1.After successful selection process 2.After RESET	shift actuator / transmission
152	Change over error during gate selection procedure	Driving: When failure occurs during shifting, gate cylinder shifts back into last gate position and t/m shifts back into the last gear. If last gear is not shiftable because of overspeed condition, the next possible target gear, which is next to last gear will be shifted. When highest shiftable gear could not be shifted because of overspeed condition, then t/m shifts to neutral. Stationary: If target select position could not be engaged, t/m shifts into neutral. New shifting of start off gear must be initiated by selector switch.	1.After successful selection process 2.After RESET	shift actuator / transmission
153	Selector cylinder does not engage	Driving and stationary: T/m shifts into neutral position. New shifting of gear must be initiated by selector switch. If no gate could be engaged, system not available.	1.After successful selection process 2.After RESET	shift actuator / transmission
154	Main transmission gear does not disengage	Driving: Clutch engages in previous gear. Next attempt to shift must be initiated by selector switch. Stationary: Gearshifting only permitted after neutral signal has been reached. Start off and driving can be tried with engaged gear, if gear is equal or lower than lowest gear in range high position.	1.Neutral position could be reached 2.After RESET	low air press. / shift actuator / transmission
155	Main transmission gear does not engage	Driving: New shifting of start off gear must be initiated by selector switch. Stationary: If gear does not engage after several gearshifts t/m will be shifted back to neutral. New shifting of start off gear must be initiated by selector switch.	1.Any main gear could be engaged 2.After RESET	low air press. / shift actuator / transmission

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156	Wrong gear shifting	Automatic neutral shifting. Clutch remains opened, if neutral could not be shifted. New shifting of gear must be initiated by selector switch	1. Correct gear shifting 2. After RESET	shift actuator / transmission
158	Shift sensor signal leaves engaged position during driving	Valves will be activated again. If gear has been disengaged completely, a suitable gear depending on speed condition will be shifted automatically.	1. gear Gear end position has been reached 2. After Reset	shift actuator / transmission
159	Range-change group sensor signal leaves engaged position during driving	Valves will be activated again. If gear has been disengaged completely, a suitable gear depending on speed condition will be shifted automatically.	1. Range end position has been reached. 2. After Reset	shift actuator / transmission
160	Splitter sensor signal leaves engaged position during driving	Valves will be activated again. If gear has been disengaged completely, a suitable gear depending on speed condition will be shifted automatically.	1. Splitter end position has been reached 2. After Reset	shift actuator / transmission
163	Engine does not react on torque intervention	Driving: Gearshifting blocked. Stationary: Starting allowed. Decreased clutch functionality and comfort.	1. Engine speed increase possible (Test will be started automatically each time with t/m in Neutral) 2. After RESET	FMR
164	Error on "Drivers demand engine percent torque" (EEC1)	Driving: Gear shifting blocked. Stationary: Clutch opens, when coming to stand still. When stand still T/m shifts automatically to Neutral. Start off possible. When coming to standstill, medium start off gear will be shifted. No other functional restrictions. Failure codes 164 and 165 always appear together.	Signal available or after RESET.	--> "specials"
165	Error on "Accelerator pedal position" (EEC2)	Driving: Gear shifting blocked. Stationary: Clutch opens, when coming to stand still. When stand still T/m shifts automatically to Neutral. Start off possible. When coming to standstill, medium start off gear will be shifted. No other functional restrictions. Failure codes 164 and 165 always appear together.	Signal available or after RESET.	--> "specials"
166	Permanent idle signal	Driving: Shifting during driving allowed. Stationary: No manoeuvring and startoff possible. System not available.	After RESET	--> "specials"
167	Error on "Percent load at current speed" signal (EEC2)	No other functional restrictions	Signal available or after RESET.	--> "specials"

169	Cut-off relay in ECU does not switch off	System not available.	after RESET, if the failure will not be sensed	shift actuator
170	No voltage supply at pin 30 or cut-off relay in ECU does not switch on	System not available.	after RESET, if the failure will not be sensed	vehicle el. syst. / shift actuator
171	Error on "Actual engine percent torque" signal (EEC1)	Driving: No calculation of vehicle weight and driving resistance possible. No calculation of startoff gear possible. Actual engine percent torque will be substituted by drivers demand information. Shift quality could be reduced. Stationary: Start off possible. When coming to standstill, medium start off gear will be shifted. Warning for clutch overload detection and reaction on overload detection could appear earlier.	Signal available or after RESET.	--> "specials"
173	Error on "Brake switch" signal (CCVS)	Foot brake is considered active and in consequence, clutch disengages always at foot brake related engine speed (higher engine revolution)	Signal available OR with decreasing signal edge or after RESET.	vehicle el. system
174	Error on "Kickdown switch" signal (EEC2)	No Kickdown operation mode possible. No other functional restrictions.	Signal available or after RESET.	--> "specials"
175	Error on "Ignition lock" signal (Key 15)	Driving: Gearshifting in general blocked, as soon as no ignition on signal is detected (failure detection might be delayed). Standstill: If engine is running, ECU does not switch off. Start off gear shiftable (forward and reverse). Driving with start off gear possible. If engine is not running, t/m will be automatically shifted to neutral and ECU switches off. No initialization of system possible. System not available.	If ignition signal is on (rising signal edge) or after RESET.	vehicle el. system
177	System-CAN Busoff error	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	failure is no longer detected or after RESET	vehicle el. system
178	CAN Errorwarning	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	failure is no longer detected or after RESET	vehicle el. system
179	CAN queue overrun	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	failure is no longer detected or after RESET	vehicle el. system

Failure codes System reactions

188	ECU fault - wrong interrupt	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	vehicle el. system
189	ECU fault - stack watch	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	vehicle el. system
190	EOL EEPROM parameter out of valid range	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	vehicle el. system
191	EOL EEPROM parameter checksum error	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	vehicle el. system
192	ECU fault - EEPROM access failure	No calculation of driving resistance possible. No automatic calculation of start off gear. When coming to standstill, medium start off gear will be shifted. No other functional restrictions.	After RESET and EEPROM is readable	operating failure / shift actuator
193	ECU temperature too high	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. Special display indication for ECU temperature too high alternating with gear information. System not available.	After RESET AND ECU temperature below threshold	amb. Temp.; shift actuator; t/m
197	Error on "Front axle speed" (WSI)	No calculation of driving resistance possible. No automatic calculation of start off gear. When coming to standstill, medium start off gear will be shifted. No other functional restrictions.	Signal available or after RESET.	vehicle el. system
198	Error on "Relative wheel speeds" (WSI)	No other functional restrictions	Signal available or after RESET.	vehicle el. system
216	IES: CAN_message ID512 (ABS/ASR_ECU) timeout	No calculation of driving resistance possible. No automatic calculation of start off gear. When coming to standstill, medium start off gear will be shifted. No other functional restrictions.	After reception of a correct message or after RESET	ABS/ASR
217	IES: CAN_message ID513 (ABS/ASR_ECU) timeout	No calculation of driving resistance possible. No automatic calculation of start off gear. When coming to standstill, medium start off gear will be shifted. No other functional restrictions.	After reception of a correct message or after RESET	ABS/ASR

Failure codes System reactions

218	IES: CAN_message ID592 (FMR) timeout	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	FMR
219	IES: CAN_message ID593 (FMR) timeout	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	FMR
222	IES: CAN_message ID1104 (FMR) timeout	No calculation of driving resistance possible. No automatic calculation of start off gear. When coming to standstill, medium start off gear will be shifted. No other functional restrictions.	After reception of a correct message or after RESET	FMR
223	IES: CAN_message ID1360 (FMR) timeout	Driving: Gearshifting blocked. Stationary: Clutch opens, when coming to standstill. Neutral automatically engaged at standstill. Gearshifting blocked, continued driving not possible. System not available.	after RESET, if the failure will not be sensed	FMR
228	IES: plausibility error switching crane cabine / driver cabine	Driver cabine mode is supposed	after RESET	vehicle el. system