

## System Messages

Error	Description	Component	Display text	Cause / Action	Effect
1	Low voltage during system start	F, H, L, F-AC, H-AC	Low voltage  ELECTRICAL SYSTEM	Check battery voltage, charge battery; Check wire connection to controller; check main current fuse; check main contactor; replace control part; Replace component; (Limit $V_N = 80V$ : $V_{Batt} < 64V$ or $V_{Cap.} < 56V$ Limit $V_N = 48V$ : $V_{Batt} < 34V$ or $V_{Cap.} < 34V$ Limit $V_N = 24V$ : $V_{Batt} < 17V$ )	Travel is inhibited.  Reduced power for travel and lifting. Warning symbol flashing (Else-Check).
2	Overvoltage	F, H, L, F-AC, H-AC	Overvoltage BATTERY CONTROLLER	Check battery voltage; replace controller part; replace component; (Limit $V_N = 80V$ : $V_{Batt} > 92V$ Limit $V_N = 48V$ : $V_{Batt} > 62V$ Limit $V_N = 24V$ : $V_{Batt} > 28V$ )	No travel or hydraulic functions Warning symbol flashing (Else-Check).
3	Temperature limit for controllers > 80°C (>70°C MP1510C) or ACS only: Info at > 85°C Err at > 115°C Err at < -20°C	F, H, L, F-AC, H-AC	TEMPERATURE CONTROLLER	Check sensor and wire connections Allow controllers to cool down; check fan operation, improve cooling. Warm up the controller and operate at reduced level until the controller has warmed up.	Reduced power for travel and lifting. Warning symbol flashing (Else-Check).
4	Emergency Disconnect applied during travel	F	POWER SUPPLY	Warning ( $V < 20V$ MP1510C)	Brake applies, travel inhibited

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5	Overvoltage	F, F-AC, H-AC	ELECTRICAL SYSTEM	Check wire connection to battery, checkBattery, replacecontroller part; Replace component; (Limit for Retrak: $V_{Batt} > 62 V$ Limit for MP1510C: $V > 32 V$ )	Brake applies, travel inhibited
6	Wire breakage: - Travel setpoint device	C, I2, I3, I4, I5, Travel switch	TRAVEL SWITCH	Check wire connection; Replace travel setpoint device; Replace Canion/ Interface;	Travel stop. "Warning" symbol flashes (Else-Check). Hydraulic functions possible
7	Key switch applied duringtravel	F,F-AC,H-AC	KEY SWITCH	Warning ( $V < 13V$ for 200ms MP1510C)	Brake applies, travel inhibited
8	2 travel directions applied simultaneously	F-AC, H-AC, C, MP, S, I2, I3, I5, FS	ELECTRICAL SYSTEM	Warning, replace travel direction switch, replace Interface 7 Canion; replace Multipilot / Solopilot For twin pedal, check the electrical system.	Travel stop. "Warning" symbol flashing (Else-Check). Hydraulic functions possible
9	Operator protection switch faulty	I2, FS	ELECTRICAL SYSTEM	Check switch, check wire connections	
10	$V_{Cap.} <> V_{Batt}$ ; (main contactor jammed or not open)	F, H, F-AC, H-AC L	MAIN CONTACTOR	Check main contactor, check wire connection; check output pin 2 (ACS) of traction controller; replace component	No travel, hydraulics Warning symbol Flashing warning (Else-Check).
11	Offset error armature / field current (DC) Stator current (AC); Current measurement point	F, H, L, F-AC, H-AC	CONTROLLER	Check main current wire, replace component	Travel no function

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12	Disable driver field rheostat faulty for DC Disable driver power stage faulty (forAC)	F, H F-AC, H-AC L	CONTROLLER	Replace component; for AC: Check flat belt wire connection; replace power part	No travel, hydraulics Warning symbol Flashing warning (Else-Check).
13	Disable Watchdog field faulty	F, H	CONTROLLER	Replace components	Travel no function
14	- Main contactor notclosed - Field power stage cannot be switched on (DC)	F, H, F-AC, H-AC	CONTROLLER/ MAIN CONTACTOR	Check wire connection; check main contactor; check charging connection, Check field supply fuse, Replace component.	No travel, hydraulics Warning symbol Flashing warning (Else-Check).
15	Disable field faulty; Illegal address (for AC)	F, H, F-AC, H-AC L	CONTROLLER	Replace controlpart; replace component	Travel no function
16	Disable driver armature actuator faulty; Software reset (for AC)	F, H, F-AC, H-AC	CONTROLLER	Replace controlpart (AC); replace component	Travel no function
17	Disable Watchdog armature faulty	F, H	CONTROLLER	Replace components	Travel no function
18	DC: Armature power stage cannot be switched on AC: one of the 3 phases cannot be switched on	F, H, F-AC, H-AC L	CONTROLLER	Check armature wire connection; replace power part; replace component	Travel no function

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19	Disable armature faulty; Power stage short circuit (for AC) The error may be triggered by the faulty speed sensor in connection with AS4814Plus controllers. Sensor wheel wobbles (elliptical) or the sensor-sensor wheel gap is too big. In this case the component is not faulty. A short circuit cannot be resolved by switching the truck off/on.	F, H, F-AC ,H-AC, L-AC	CONTROLLER	Replace power part; Replace component. Can occur in connection with error 70, in this case: check power supply behind the main contactor contact, in the event of an error the voltage will be much lower here than the rated operating voltage. Disconnect the positive supply from the components to target the error cause. The exception here is the F1 traction controller which must remain connected. One component overloads the testing voltage due to internal short circuit. The testing voltage arises by charging the internal capacitor batteries via a resistor to the level of the control voltage supply.  Check sensor, replace sensor and / or sensor wheel.	Travel no function
20	Armature incorrectly connected	F, H	ELECTRICAL SYSTEM	Check armature main current wire connection	Travel no function
21	Armature overvoltage (short circuit / high side faulty)	F, H, F-AC, H-AC L	CONTROLLER/ELECTR	Check main current wire to armature; check settings (for AC); check speed sensor (for AC); check static charge (for AC); $A_{\text{Armature}} > 360\text{A}$ for 250ms (MP1510); Replace component.	

Error	Description	Component	Display text	Cause / Action	Effect
22	Watchdog error; Watchdog does not run out	F, H, L, M, S, A, I2, I3, I4, C, F-AC, H-AC, FS	CONTROLLER/ CANION	Truck reset, Replace controlpart; replace component	No travel, hydraulics Warning symbol Flashing warning (Else-Check).
23	- Computer overload - Permanent interrupt - "ACS" timeout on CAN connection	F, H, L, M, S, A, I2, I3, I4, C, F-AC, H-AC, FS	CONTROLLER / CAN	Check CAN bus connection; Check CANION connector and component; Replace component	No travel, hydraulics Warning symbol Flashing warning (Else-Check).
24	EEPROM cannot be contacted / parameters not plausible / parameter set to default Faulty checksum	F, H, L, I2, I3, I4, C, F-AC, H-AC MFC brake MFC hydr. , travel switch	CONTROLLER/ CANION	Check battery cable; check V <sub>Batt</sub> ; set trucktype, set default parameters; replace control part; replace component Delete logbook, change parameters, set hourmeter, replace component	Flashing warning symbol (Else-Check).
25	No telegrams: - no logon from interface  - no telegrams from Can-Bus travel switch	F, H, I4, I8 F-AC, H-AC L	INTERFACE / CAN	Check CANBus connection, check wire connection between proportional valve – modulation; check fuse 1F8; replace iInterface (I2, I4, I8) ; replace lift potentiometer, Multipilot, Solopilot or interface; <u>MP1510C</u> : Voltage collapses, controller logs on again, interface does not, controller remains blocked and waits for interface. Check battery voltage (with load!); charge or replace battery if necessary; <u>AS2409K</u> : no "live" telegram received from CAN Bus travel switch for more than 300 ms; replace travel switch	

Error	Description	Component	Display text	Cause / Action	Effect
26	Wire breakage: - Lift potentiometer	M, S, I2, I3	MULTIPILOT / SOLOPILOT / LIFT POTENTIOMETER	Check wire connection	Lift stop. "Warning" symbol flashes (Else-Check), travel enabled
27	Wire breakage: - Steering setpoint device; ◇ Reach truck: for 45° steering bolster movement no flank from proximity switch. ◇ Canion: "Steer angle acquire active" parameter has incorrect value ◇ Juniors PM2402L: "Operating mode" parameter incorrectly set	C, L, I3, I4	STEER ACTUAL ANGLE	Check wire connection; Replace steer angle sensor / potentiometer; Replace Canion / Interface; Replace steering;  PM2402L from software version 1.60: set parameter P511 "operating mode" correctly ◇ 1 = analog sensor (potentiometer), 2 = digital sensor on steer motor	Crawl speed, Flashing warning symbol (Else- Check), hydraulic functions enabled. This error produces an emergency stop on the reach truck and the Juniors.
28	Wire breakage: - Steering sensor	C, L, I3, I4	STEER NOMINAL ANGLE	Check wire connection, replace steering wheel sensor;replace Canion / interface; replace steering	Crawl speed, Flashing warning symbol (Else- Check), hydraulic functions enabled. This error produces an emergency stop on the reach truck
29	Wire breakage: - Traverse potentiometer	M	Traverse nominal value MULTIPILOT	Replace Multipilot	
30	Wire breakage: - Tilt potentiometer	M	Tilt nominal value MULTIPILOT	Replace Multipilot, Teach Multipilot (Hall sensor 2003 only)	

Error	Description	Component	Display text	Cause / Action	Effect
31	Wire breakage: - ZH1 setpoint device  - Initial lift / lower Setpoint device	M, S  Travel switch	Sideshift nominal value MULTIPILOT / SOLOPILOT	Replace Multipilot / Solopilot, Teach Multipilot (Hall sensor 2003 only);  Travel switch: Check / replace switch	Hydraulic functions stop, "Warning" symbol flashes (Else-Check), travel enabled
32	Wire breakage: - ZH2 setpoint device	M, S	MULTIPILOT / SOLOPILOT	Replace Multipilot / Solopilot, Teach Multipilot (Hall sensor 2003 only)	Hydraulic functions stop, "Warning" symbol flashes (Else-Check), travel enabled
33	Wire breakage: - ZH3 setpoint device	M, I8	MULTIPILOT	Replace Multipilot	
34	CANBus damaged	F, H, L, M, S, A, I2, I3, I4, I5, C, F-AC, H-AC Travel switch	CAN-BUS	Check CAN bus connection; replace faulty component; Check terminal resistances	No travel, hydraulics Warning symbol Flashing warning (Else-Check). Only stored in logbook (from 2004).
35	No travel zero position Deadman and accelerator pedal applied when truck switched on	I2, I3, I4, C Travel switch	TRAVEL ZERO POSITION	Warning, check travel switch; Intermittent contact in interface power supply (12 volts) Check Canion, for twin pedal check electrical system	Travel stop, Flashing warning symbol (Else- Check), hydraulic functions enabled.
36	No lift zero position	M, I2, I3,FS	LIFT ZERO POSITION	Warning, check lift setpoint device.	Hydraulic functions stop, "Warning" symbol flashes (Else-Check), travel enabled
37	No steering angle nominal value	L	CONTROLLER / CAN	Check steering setpoint device;Check CANBus connection; check "steer type" parameter; Replace component (15)	

Error	Description	Component	Display text	Cause / Action	Effect
38	Component does not log on, self test not concluded.	F, H, L, I2, I3, I4, C, A, M, S, F-AC, H-AC	CONTROLLER / CAN	Check CAN-Bus connection and voltage; check DIL switch 7 encoding (MP1510); steering controller monitoring activated? (AS2412F); check ACS encoding; replace component	No travel, lifting Warning symbol Flashing warning (Else-Check).
39	Implausible truck type 1. Discovered during the self test phase that at least one component has a different truck type as a parameter. A different truck type was discovered in operating mode. Caused by intermittent contacts in the power supply connections	F, H, L, I2, I3, I4, I5, A, M, F-AC, H-AC	TRUCK TYPE	For 1. Set truck type; For 2. Examine and if necessary replace switch (key switch) or rectify intermittent contact in power supply plug connections. Set truck type.	
40	Motor overtemperature Traction motor overtemperature in operating mode.> 150°C And travel speed < 1km/h For ACS: Info > 145°C Err > 165°C	L, F, H F-AC, H-AC	TEMPERATURE MOTOR	Warning; check motor sensor system and wire connections; Check motor; traction motor brake open?	Reduced power for travel and lifting. Warning symbol flashing (Else-Check). For steering only warning symbol flashing.

<b>Error</b>	<b>Description</b>	<b>Component</b>	<b>Display text</b>	<b>Cause / Action</b>	<b>Effect</b>
41	Brake magnet potentiometer Potentiometer voltage less than 0.3 volts or greater than 2.7 volts for more than 500ms.	L	BRAKE MAGNETPOTENTIOM ETER	Check potentiometer; check potentiometer attachment; check wire connection	
42	- Short circuit between the output and battery positive.(EJC, ELE) -Brake magnet control, below minimum difference on potentiometer for 500 ms when magnet applied. (150mV ) No brake pressure during initialization. Brake pressure after the Emergency Stop magnet has applied;	L,F	BRAKE MAGNET	Check wire connection, check brake magnet; replace component	
43	Adjust brake	L	ADJUST BRAKE	Adjust brake; check potentiometer	

Error	Description	Component	Display text	Cause / Action	Effect
44	-Brake not connected or connection wire short circuit  -Brake cable torn <i>Only for steer category_3:</i> Internal driver of failsafe brake cannot connect the relay Or short circuit bypass (contact jams) on the output during power up test	L,F	BRAKE FAULTY	-Check brake wiring, replace brake if necessary -Replace brake cable, check potentiometer; Check potentiometer attachment;  <i>Only for steer category_3:</i> -Check brake driver output, check switch contact plausibility, Replace steer component.	No release
45	Too many pulses from steering setpointdevice Intermittent contact or perturbing radiation. More than 255 pulses identified within 100ms	L,15	STEERING WHEEL	Check wire connection, replace sensor bearing; replace component	
46	Steering setpoint devicewrongly connected AS4803L: More than 3 pulses identified in one direction and more than 3 pulses in another within 100ms.	L,15	STEERING WHEEL	Check sensor bearing connection; check wireconnection AS4803L: Check steering wheel recognition input.	

<b>Error</b>	<b>Description</b>	<b>Component</b>	<b>Display text</b>	<b>Cause / Action</b>	<b>Effect</b>
47	No pulses from steer setpointdevice ETVQ steering wheel no pulses from 1st sensor bearing. More than 10 pulses were obtained from the stepper motor but fewer than 3 pulses were counted within 200ms from the sensor bearing.	L,15	STEERING WHEEL	Check wire connection, replace sensor bearing; replace component	No release
48	Does not match the "Steering type" parameter ETVQ steering wheel no pulses from stepper motor or 2nd sensor bearing. More than 10 pulses were obtained from the sensor bearing but fewer than 2 pulses were counted within 200ms from the stepper motor sensor bearing.	L	STEERING TYPE	Set steering type correctly ETVQ: Check stepper motor coupling, tighten grub screw.  Test both setpoint device branches, set defaults and truck type Otherwise faulty, replace component.	
49	CAN supply interrupted; Supply above 14 volts or less than 10 volts, Can or sensor bearing incorrectly supplied	AS 2412 F,H-AC	Can Bus CAN supply	Suply on CAN connector greater than 14 volts (electrical system short circuit, component)	Travel disabled

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50	NRG Multipilot wire breakage Horizontal tilt	M	Setpoint device horizontal	Check Multipilot wire connection Parameter 540 set to 1 by mistake	Travel and lifting disabled.
51	Teach-In: steering actual value potentiometer	L	Incorrect setting SETTING	Repeat calibration, check wire connection;check potentiometer;replace component	
52	Teach-In: Brake magnet potentiometer	L	Incorrect setting SETTING	Repeat calibration, check wire connection;check potentiometer;replace component	
53	Teach-In: Steering setpoint potentiometer	L	Incorrect setting SETTING	Repeat calibration, check wire connection;check potentiometer;replace component	
54	Motor wire breakage during power-up test ETVQ: Temperature voltage level less than 0.3 volts or greater than 2.7 volts	L, F, H	MOTOR WIRE BREAKAGE	Check wire connection; Check temperature sensor lines; replace component; replace motor	
55	Motor short circuit; Current not ok; Power stage faulty	L, F-AC, H-AC	SHORT CIRCUIT MOTOR	Check wire connection; Replace motor; Replace component	Traction motor stops, Hydraulic motor stops Warning symbol flashing (Else-Check).
56	Motor or actual value transmitter incorrectly connected	L,F,H	MOTOR REVERSE POLARITY	Check motor connection; check actual value transmitter potentiometer; AC: Phases L1,L2 or L3 swapped on motor;	


Error	Description	Component	Display text	Cause / Action	Effect
57	No actual value change Motor turns despite control signal	L,F,H	Steering controller ACTUAL VALUE TRANSMITTER	Check motor; check actual angle potentiometer; rectify mechanical wheel block; AS4803L: Check incremental bearings; replace component; Check actual value transmitter wire breakage signals PM2402L check operating mode	
58	Steering angle actual value fluctuates ETVQ: Reference mark 0° could not be started within 5 seconds or no valid segment reached. Steer motor does not turn	L	STEER ACTUAL ANGLE	Check actual value transmitter (on steer motor) Check steer motor, fuse and incremental bearing, rectify mechanical wheel block; Check proximity switch distance.	
59	Steering angle nominal value fluctuates	L	Steer angle setpoint device TILLER POTENTIOMETER	Check setpoint device potentiometer (on tiller)	

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60	Swivelling bolster does not follow steering wheel directions Deviation of > 15° for 100ms The wheel turns more than 5° without change of nominal value on steering wheel, less than 2°/sec after reaching the nominal position. Tyres over-tensioned, the actual value cannot follow the nominal value.	L	STEERING CONTROL	Check steering bolster mechanics; check chain and chain tension; check motor; check actual value transmitter attachment; Check tyres, replace wheel if necessary.	
61	Power stage error	L	CONTROLLER	Replace controller	
62	Power stage error	L	CONTROLLER	Replace controller	
63	Sensor power supply out of range  AS4803L: < 10V oder >16V	L,F-AC,H-AC	CONTROLLER	The 12 volt supply not in valid range. Monitoring of 12 volt sensor supply greater than 15 volts and less than 11 volts. Switch controller off and on, replace fuse and controller if necessary.	
64	Software version differs	L	CONTROLLER	Different software versions in the AS4803Ls in the ETV-Q. Update software to same level.	
65	NRG Multipilot wire breakage centre shifter	M	Centre switch MP centre shifter	Check Multipilot wire connection Parameter 540 set to 1 by mistake	Travel and lifting disabled.

Error	Description	Component	Display text	Cause / Action	Effect
66	NRG Multipilot wire breakage 180° / 360° steering toggle	M	180-360 switch MP toggle switch 180°/ 360°	Check Multipilot wire connection Parameter 543 set to 1 by mistake	Travel and lifting disabled.
67	NRG-Multipilot setpoint device travel direction switch jams on MP when system starts	M	Travel direction MP setpoint device	Check Multipilot switch, values in Judit MP teach window, recalibrate values	Travel and lifting disabled.
68	Safety switch wire breakage	I2, I3, I4, I5	DEADMAN	Check wire connection to safety switch (deadman, seat switch); replace safety switch	
69	Both lift and lower requested simultaneously	I2, I5, FS	LIFT/LOWERSWITCH	Check wire connection; check switch	
70	Component fails to respond or responds incorrectly to self test	F-AC, H-AC, M, S, A, I2, C	SELF TEST	Check displays on basic component (LED); note other error messages on basic card; Check wireconnectionsandcheck connector; check power supply behind the main contactor contact, in the event of an error the voltage will be much lower here than the rated operating voltage. Disconnect the positive supply from the components to target the error cause. One component overloads the testing voltage due to internal short circuit. The testing voltage arises by charging the internal capacitor batteries via a resistor to the level of the control voltage supply.	No travel, hydraulics Warning symbol Flashing warning (Else-Check).

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71	Lower potentiometer wire breakage	I2, FS	LOWER POTENTIOMETER	Check wire connection; replace lower potentiometer; replace Multipilot; replace interface	
72	No lowering zero position	I2, FS	LOWER RESTPOSITION	Warning, check lower setpoint device	
73	Valve output interface faulty	I2	VALVE OUTPUT	Warning, check valve outputs	
74	Interface valve output faulty	I2	INTERFACE FAULTY	Replace interface	
75	Proportional valve does not draw any current Correct Multipilot ??	I2,I4,C	PROP. VALVE	Check wire connection, replace proportional valve;replace Canion / interface; replace proportional valve	Flashing warning symbol (Else-Check).
76	Proportional valve short circuit	I2, I4C	PROP. VALVE	Check wire connection, replace proportional valve;replace Canion / interface; replace proportional valve	Flashing warning symbol (Else-Check).
77	Button wire breakage	I2,	BUTTON WIRE BREAKAGE	Check wire connection; replace button; replace interface	
78	Button and travel switch pressed simultaneously	I2	BUTTON / TRAVEL SWITCH	Warning: Check wire connection; replace button; replace interface	
79	Switch and deadman switch pressed simultaneously	I2	BUTTON / DEADMAN	Warning: Check wire connection; replace button; replace interface	
80	2 travel directions simultaneously	I2	ELECTRICAL SYSTEM	Check wire connection; replace button; replace interface	
81	Different parameters for the two traction controllers	F, F-AC	MOTORS	reset parameters (EFG traction controllers)	Travel inhibited

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82	Sensor wire breakage	I2	ELECTRICAL SYSTEM	Safety height: Check wire connection; replace button; replace interface	
83	2 of the same components report on the truck e.g. AS4803L: Key switch voltage cannot be assigned to components Elle_1, Elle_2 or Elle_3	F, H, I4, F-AC L-AC	ELECTRICAL SYSTEM	Check component encoding; check wire connection; replace component;	Travel inhibited
84	Faulty speed sensor: ◇ AS4803L: - Speed changes by 50% within 4ms; - Reference speed less than half the rated speed; - Steer transmission blocked; - Tear identification: a valid sensor reading is reduced to zero within 4ms and remains at this level for 50ms without producing a new valid reading. ◇ PM2402L/2 from V1.60: - Too many pulses on encoder 3 on steer motor	F,H,L-AC	SPEED SENSOR	Check speed sensor; Sensor bearing drift; Check wire connection; Replace speed sensor; Replace component;  Check wire routing, do not route together with motor supply wires!	Travel stop, Lift stop, Flashing warning symbol (Else-Check), hydraulic functions enabled.

Error	Description	Component	Display text	Cause / Action	Effect
85	Power release low voltage Travel/Steer: Capacitor voltage drops to 30V (48V) for 0.5 seconds	F,H-AC L-AC	ELECTRICAL SYSTEM TRAVEL	Switch truck on and off; check battery; check battery cable connections; check fuse; Check power connections; replace component	Travel, hydraulics no function, warning symbol Flashing warning (Else-Check).
86	Improbable speed, sudden change: → AS4803L: 2 sensor systems differ from each other (actual value transmitter)	F,H-AC L-AC	IMPROB. SPEED	Check wire connection; replace speed sensor; replace component;  Are the pulse figures correct (8 or 64 pulses/revolution)?	
	Improbable speed, sudden change: → PM2402L/2 from V1.60: PM2402z: actual value transmitter on the steer motor provides faulty signals	L	IMPROB. SPEED	Check wiring and plug connections, check wire routing (do not route together with motor supply wires); replace sensor	
87	Sensor line interrupted AS4803L: no voltage drop on a 100 Ohm internal measurement resistor MFC brake: load wheel speed sensing	F-AC L-AC MFC brake	Electrics DISCONNECTION SENSOR BEARING	Sensor wire disconnected, motor consumes maximum current and makes buzzing noise. Check sensor wires.	
88	Hydraulic speed sensor faulty on AS4814H	H (AS4814H)	SPEED SENSOR H	Check speed sensor; Check wire connection; replace speed sensor; replace component;	Hydraulics stop, Flashing warning symbol (Else-Check), travel enabled.

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89	Hydraulics power release low voltage	H	ELECTRICS-HYDRAULICS	Check battery, check battery wire connection; Check fuse; replace component	Reduced power for travel and lifting. Warning symbol flashing (Else-Check).
90	Travel with handbrake on	C	ELECTRICAL SYSTEM	Check magnetic brake switch	Flashing warning symbol (Else-Check).
91	24 volts out of range Info at <17 V Err at <15 V	C	ELECTRICAL SYSTEM	Check power supply; check wire connection	For a warning, only the warning symbol flashes (Else-Check). For an error, the truck stops.
92	Wrong component reporting on Canion	M, S, A	ELECTRICAL SYSTEM	Check Master/Solopilot; check display; replace component Check jumper in XB 27 and XB 44 from pin 2 to pin 6,	Travel, lifting function, warning symbol flashes (Else-Check).
93	ACS capacitors not charged	F, H, C	ELECTRICAL SYSTEM	Check charging connection, main contactor does not apply, check bus voltage, check transformer, fuses and cable set, Replace component	Travel, lifting no function, warning symbol flashes (Else-Check).
94	SDO error	F, H, C	SDO ERROR	Software incompatible check software version Reload software. Check jumper in XB 41 from pin 12 to pin 13.	Travel, lifting no function, warning symbol flashes (Else-Check).
95	Pin code error	C	PIN CODE ERROR	Component pin codes not identical	Travel, lifting no function, warning symbol flashes (Else-Check).

<b>Error</b>	<b>Description</b>	<b>Component</b>	<b>Display text</b>	<b>Cause / Action</b>	<b>Effect</b>
96	No zero position for hydraulics Masterpilot, Solopilot,	M,S	Hydraulics zero position MP/SOLOPILOT	Check Master/Solopilot; lift, lower, tilt, ZH1, ZH2, ZH3, horn switch not in zero position Replace component	Hydraulic functions stop, "Warning" symbol flashes (Else-Check), travel enabled
97	Segment beyond tolerance limits ◇ PM2402L/2 from V1.60: Referencing error on power up, no switch signal from proximity switch (NS) or time interval exceeded	L	FAULTY SEGMENT	Segment on swivelling bolster not within tolerance level.  Check wiring and proximity switch, check distance from switch to trip cam on swivelling bolster	

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98	<p>The position of the sensor bearing and proximity switch (segment) deviate by more than 1.1 degrees. When the truck starts up, the direction of rotation from the steering wheel sensor system to the motor power connection or the steer motor sensor system is inversed.</p> <p>◇ PM2402L/2 from V1.60: Referencing error during operation, unexpected switch signal from proximity switch.</p>	L	POSITION DEVIATION	<p>Check wiring.</p> <p>Check wiring and proximity switch, check distance from switch to trip cam on swivelling bolster</p>	
99	CANBus damaged; CANBus driver temporarily deactivated	F,H,M,S,A, I3, I4, C	CAN-BUS	Check wire connection, check terminal resistors, install truck anti-interferencemeasures;	Travel, hydraulics no function, warning symbol flashes (Else-Check).
100	NRG software versions of internal component parts implausible	M	Multipilot software	Replace component part with corresponding component, as flashing currently not possible in the field.	

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101	Input / output error	ISM	ISM input/output	Check I/Oa, rectify contact error, check operating voltage, replace external transmitter Index info in display: a— Sensor 1 supplies values, but not defined. Check parameters 11-17 b— Sensor 2 supplies values, but not defined. Check parameters 20-26 c--- Sensor 3 supplies values, but not defined. Check parameters 29-35 Or a sensor 1-3 supplies a voltage outside the range of 0.5V – 9.5V.	Shown in the driver's display with error 101
102	Internal error	ISM	ISM internal	Check operating voltage. Index info in display: a -- Communication between access module and data recording faulty, check connection e -- Radio module faulty f -- Radio channel number is "0", should be >0, check parameter 100 g -- Radio transmitting power is "0", Check parameter 101 h -- Lock number is invalid, replace access module i --- Impact sensor faulty, replace data recorder	Shown in the driver's display with error 102

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103	Parameter error	ISM	ISM parameters	Set parameters Index info in display: a -- Parameter 5 greater than parameter 6, should be smaller. b -- Differential value of parameter 11 is greater than the differential values of the various stages of parameters 12-17 c --- Differential value of parameter 20 is greater than the differential values of the various stages of parameters 21-26 d -- Differential value of parameter 29 is greater than the differential values of the various stages of parameters 30-35 e --- the stages of parameters 12-17 ... f -- the stages of parameters 21-26 ... g --- the stages of parameters 30-35 ... h -- Impact stages of parameters 47-49 ... i -- Impact stages of parameters 50-52 ... ..are not in increasing order	Shown in the driver's display with error 103
	EFG: Setting error combination option ZH modification and ZH3 toggle switch function	C	EFG: ERR 103	EFG: Check parameter setting, adjust if necessary	EFG: No hydraulic functions possible

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104	Sensor bearing provides no pulses on system start up	F,H	(SENSOR BEARING)	Check sensor bearing and wire, replace sensor bearing or controller	
105	Motor temperature gauge provides incorrect values Sensor line wire breakage	F,H,L	Temp.Motor	Check sensor connection and lines, if possible replace sensor, otherwise replace the entire motor...	
106	Controller temperature gauge provides incorrect values	F,H,L	Temp. controller	Internal error, replace controller.	
107	Key switch voltage out of range Hardware encoding incorrect	F,H,L MFC hydr. MFC brake	Electrics	Error in controller connection (Saab connector) on component	No travel No lifting No steering Main contactor open
108	Calibration reading incorrect	F,H	(CONTROLLER internal)	Internal error, replace controller.	
109	Brake pedal faulty	MFC brake	BRAKE PEDAL	Brake pedal signals implausible	
110	Current output faulty	MFC brake MFC hydr. MFC option	CONTROLLER	Check outputs for short circuits	MFC_Hydr.: no lifting MFC_Brake: crawl speed only
111	Steering controller is monitored by traction controller for signs of life telegrams Traction controller does not receive these telegrams. The Can Bus is overloaded.	F	Steering controller	Check steering controller	Travel inhibited Main contactor open

Error	Description	Component	Display text	Cause / Action	Effect
112	Steering controller_2 is monitored by traction controller_1 for signs of life telegrams The Can Bus is overloaded.	F	Traction controller	Check Can Bus, measure terminal resistor 60Ohm	
113	Lift controller does not send lift telegrams	H	LIFT CONTROLLER	Check control voltage	
114	No traverse distance reference on power up	MFC hydr.	Info 32 Traverse reference	None	Reduced traverse speed until both stops have been reached once.
115	Main contactor improbable, contacts not closed. Wire connection interrupted, faulty main contactor driver on traction controller Driver on AS4803z steering controller faulty.	F,H,L ??	Main contactor improbable	Check wire connection. If error 19 is also present, disconnect the shorted power stage Disconnect the power positive. Check driver voltage (switched against negative). If reading OK, check contactor coil and mechanics. Check AS4803z steering controller, replace if necessary	No truck functions
116	After software flashing (field operation), the item number of the software is implausible and parameters may also be implausible.	F,H, MFC brake MFC prop	Info 54  SET TRUCK TYPE	Set truck type and switch truck off / on (wait approx. 35 seconds). On request, automatically: all parameters are set to default, the software item number is set to plausible, the log book is deleted, the hourmeter set to zero and entry 116 made in the log book.	In the log book only error 116 stands as a marker for this process and all parameters can be at default.

Error	Description	Component	Display text	Cause / Action	Effect
117	Cab position implausible, rotary potentiometer value does not match 180 degree switch	CANION	Cab position	Check rotary potentiometer, re-adjust if necessary, check 180 degree switch	No TRAVEL release
118	Steering controller reports error	L	Steering controller	Check display on steering controller	TRAVEL inhibited, EMERGENCY STOP activated
119	Weigher button faulty	MFC brake	Button faulty	Check wire and button	Weighing interrupted
120	Weigher pressure sensor faulty	MFC hydraulics	Sensor faulty	Check wire and sensor	Weighing interrupted
121	Battery incorrectly locked	F-AC CANION	Battery lock	ECR: Locking strips stuck? Check proximity switch EFG D30: For automatic battery locking only, check the locking/unlocking sensor system, check mechanical / hydraulic system.	No truck functions
122	Start up error, Magnetic brake wrongly connected. The truck model does not match the internal brake characteristic curve.	MFC brake	Check load wheel brake connection	Set the truck model to rectify this. Warning 54 (set truck model) is issued. If this does not help, check the load wheel brake connection. Modification kits must be provided by the spare parts department.	No travel operations
123	Encoding in connector does not match multifunction lever	MFH	ERR_OPERATING MODE_IMPROBABLE	Wrong operating mode: check jumpers in connector or replace multifunction lever	Travel and lifting disabled
124	Mast reach damping sensor (MVD) - 2 channels improbable	MFC hydraulics	Sensor faulty	Check wire connection, replace sensor	Truck travels at reduced speed

Error	Description	Component	Display text	Cause / Action	Effect
130	Wrong travel direction	M, S	ERR + node number + error number	Direction switch faulty	Travel disabled
131	Faulty communication with E box	T, E	ERR + node number + error number	E box faulty, CAN-Bus fault	Travel disabled
132	Communication with ISM faulty	T, ISM	ERR + node number + error number	ISM faulty, CAN-Bus fault	Travel disabled
133	Communication with Pluto faulty	T, P	ERR + node number + error number	Pluto faulty, CAN-Bus fault	Travel disabled
134	Multi-/Solopilot applied at start	M, S	INF + node number + error number	Multi-/Solopilot moved or button pressed when truck started up. Switch off truck, switch on truck without moving Multi-/Solopilot or pressing a button.	Travel disabled
135	Multi-/Solopilot reports an error (axle error, EEPROM error, etc.)	M, S	ERR + node number + error number	Check Multi-/Solopilot connections, replace components.	Travel disabled
136	Error in operating system (API)	T	ERR + node number + error number	Read logbook to gain a clearer picture of the error.	Travel disabled
137	Error in sensor power supply + 5 V	T	ERR + node number + error number	Power supply overload, TCU faulty	Travel disabled
138	Error in sensor power supply + 8 V	T	ERR + node number + error number	Power supply overload, TCU faulty	Travel disabled
139	Watchdog triggered a reset within the TCU	T	ERR + node number + error number	Timeframe not kept within the software. Software error.	Travel disabled
140	Software error, various causes	T	ERR + node number + error number	Error in software, should not occur on site. Read logbook to gain a clearer picture of the error.	Travel disabled

Error	Description	Component	Display text	Cause / Action	Effect
141	Initialisation error: at least one software module could not be correctly initialised	T	ERR + node number + error number	TCU-internal error during parameter exchange.	Travel disabled
142	Accelerator pedal: voltage error, signal voltage too high or too low	T	ERR + node number + error number	Broken wire or signal voltage short circuit to power supply or earth; Pedal faulty	Travel disabled
143	Accelerator pedal: switch error, zero position switch position does not match the signal reading	T	ERR + node number + error number	Broken wire or short-circuit in switch ports or signal line; Pedal faulty	Travel disabled
144	Accelerator pedal: teach-in error	T	INF + node number + error number	Teach value out of range. Teach-in the accelerator pedal again.	Error reported
145	Reverse pedal: voltage error, signal voltage too high or too low	T	ERR + node number + error number	Broken wire or signal voltage short circuit to power supply or earth; Pedal faulty	Travel disabled
146	Reverse pedal: switch error, zero position switch position does not match the signal reading, accelerator pedal and reverse pedal improbable	T	ERR + node number + error number	Broken wire or short-circuit in switch ports or signal line; Pedal faulty	Travel disabled
147	Reverse pedal: teach-in error	T	INF + node number + error number	Teach value out of range. Teach-in the reverse pedal again.	Error reported
148	Brake pedal: voltage error, signal voltage too high or too low	T	ERR + node number + error number	Broken wire or signal voltage short circuit to power supply or earth; Pedal faulty	Travel disabled

Error	Description	Component	Display text	Cause / Action	Effect
149	Brake pedal: switch error, zero position or end position switch positions do not match the signal reading; zero position switch and end position switch not inter-compatible	T	ERR + node number + error number	Broken wire or short-circuit in switch ports or signal line; Pedal faulty	Travel disabled
150	Brake pedal: teach-in error	T	INF + node number + error number	Teach value out of range. Teach-in the brake pedal again.	Error reported
151	Steer angle sensor error	T	ERR + node number + error number	Steer angle sensor faulty, broken wire, short circuit	Only inching available
152	Pressure sensor A: signal error	T	ERR + node number + error number	Pressure sensor offers invalid reading	Travel only in recovery mode
153	Pressure sensor B: signal error	T	ERR + node number + error number	Pressure sensor offers invalid reading	Travel only in recovery mode
154	Speed sensor left: signal error	T	ERR + node number + error number	Speed sensor for the left wheel offers an invalid signal / phase signal missing. Broken wire or faulty sensor.	Travel only in recovery mode
155	Speed sensor right: signal error	T	ERR + node number + error number	Speed sensor for the right wheel offers an invalid signal / phase signal missing. Broken wire or faulty sensor.	Travel only in recovery mode
156	Speed sensors: recorded speed is greater than the max. permitted speed	T	INF + node number + error number	Truck travels too quickly; sensors supply too many pulses	Error reported
157	“Forward travel pump” pulse width modulation (PWM) control valve: control error	T	ERR + node number + error number	Broken wire, short circuit to supply / earth	Travel disabled

Error	Description	Component	Display text	Cause / Action	Effect
158	“Reverse travel pump” pulse width modulation (PWM) control valve: control error	T	ERR + node number + error number	Broken wire, short circuit to supply / earth	Travel disabled
159	“Lower” pulse width modulation (PWM) control valve: control error	T	ERR + node number + error number	Broken wire, short circuit to supply / earth	Operating functions inhibited
160	“Lift” pulse width modulation (PWM) control valve: control error	T	ERR + node number + error number	Broken wire, short circuit to supply / earth	Operating functions inhibited
161	“Fwd. tilt” pulse width modulation (PWM) control valve: control error	T	ERR + node number + error number	Broken wire, short circuit to supply / earth	Operating functions inhibited
162	“Rev. tilt” pulse width modulation (PWM) control valve: control error	T	ERR + node number + error number	Broken wire, short circuit to supply / earth	Operating functions inhibited
163	“ZH1 fwd. (sideshift)” pulse width modulation (PWM) control valve: control error	T	ERR + node number + error number	Broken wire, short circuit to supply / earth	Operating functions inhibited
164	“ZH1 rev. (sideshift)” pulse width modulation (PWM) control valve: control error	T	ERR + node number + error number	Broken wire, short circuit to supply / earth	Operating functions inhibited

Error	Description	Component	Display text	Cause / Action	Effect
165	“ZH2 fwd.” pulse width modulation (PWM) control valve: control error	T	ERR + node number + error number	Broken wire, short circuit to supply / earth	Operating functions inhibited
166	“ZH2 rev.” pulse width modulation (PWM) control valve: control error	T	ERR + node number + error number	Broken wire, short circuit to supply / earth	Operating functions inhibited
167	“Retarder” pulse width modulation (PWM) control valve: control error	T	ERR + node number + error number	Broken wire, short circuit to supply / earth	Report error
168	General pulse width modulation (PWM) error	T	ERR + node number + error number	Parameter error	Travel disabled
169	Release valve operating functions: control error	T	ERR + node number + error number	Broken wire, short circuit to supply / earth	Error reported
170	Travel release valve: control error	T	ERR + node number + error number	Broken wire, short circuit to supply / earth	Travel disabled
171	Parking brake valve: control error	T	ERR + node number + error number	Broken wire, short circuit to supply / earth	Error reported
172	EEPROM: read error	T	ERR + node number + error number	Error present in at least one EEPROM assembly. EEPROM may be faulty.	Error reported
173	Recovery switch: recovery function still active	T	ERR + node number + error number	The recovery switch was not reset for normal operation	Travel disabled
174	Speed sensors: sensor readings from left/right sensor faulty	T	ERR + node number + error number	Faulty sensor	Travel only in recovery mode

Error	Description	Component	Display text	Cause / Action	Effect
175	ZH2 / ZH3 toggle valve: control error	T	ERR + node number + error number	Broken wire, short circuit to supply / earth	Operating functions inhibited
176	Diesel engine: Actual speed error	ECU	ERR + node number + error number	ECU reports invalid actual speed	Error reported
177	Diesel engine: Error in coolant temperature	ECU	ERR + node number + error number	ECU reports invalid coolant temperature	Error reported
178	Motor model not set	T	INF + node number + error number	Service parameter not set for engine model. Motortyp setzen.	Error reported
179	Communication with ECU interrupted	T	ERR + node number + error number	CAN Bus to ECU damaged, ECU damaged	Travel disabled
180	Self test: parking brake does not engage	T	ERR + node number + error number	Parking brake or valve faulty	Travel disabled
181	Self test: at least one pressure sensor is supplying an invalid signal reading	T	ERR + node number + error number	Pressure sensor faulty	Travel disabled
182	Self test: recorded feed pressure out of range	T	ERR + node number + error number	Error in feed pump, Error in hydraulic system	Travel disabled
183	Self test: release valve for travel pump jams when open	T	ERR + node number + error number	Release valve faulty	Travel disabled
184	Self test: release valve for travel pump jams when closed	T	ERR + node number + error number	Release valve faulty	Travel disabled
185	Self test: pressure sensors swapped	T	ERR + node number + error number	Pressure sensors installed in wrong positions or connector swapped	Travel disabled

Error	Description	Component	Display text	Cause / Action	Effect
186	Self test: self-test interrupted	T	INF + node number + error number	Motor speed too low, seat switch not pressed	Travel disabled
187	Oil temperature: out of range	T	ERR + node number + error number	Oil temperature sensor faulty; short circuit or broken wire	Fan rises
188	Reservoir sensor: out of range	T	ERR + node number + error number	Reservoir sensor faulty; short circuit or broken wire	Error reported
189	Lift height sensor: signal error	T	ERR + node number + error number	Lift height sensor faulty; short circuit or broken wire	Error reported
190	Tilt angle sensor: signal error	T	ERR + node number + error number	Tilt angle sensor faulty; short circuit or broken wire	Error reported
191	Combustion engine: coolant temperature too high	T	INF + node number + error number	Error in engine or coolant circuit	Error reported (LED in display, logbook entry)
192	Sideshift sensor: teach-in error	T	INF + node number + error number	Teach value out of range.	Error reported
193	Anti-stall engine protection active	T	INF + node number + error number	Operations requested overload the engine: engine speed drops, which would cause the engine to go out	Operating functions inhibited
194	Sideshift centre sensor reading improbable	T	ERR + node number + error number	Sideshift centre sensor faulty; short-circuit or broken wire	Travel disabled
201	Optical sensor faulty	Rack height select	sensor		
202	Too many reference points during calibration	Rack height select	Calibration wrong		
203	Sensor evaluation improbable	Rack height select	sensor		

<b>Error</b>	<b>Description</b>	<b>Component</b>	<b>Display text</b>	<b>Cause / Action</b>	<b>Effect</b>
204	Error when reading EEPROM	Rack height select	Controller		All settings set to default
205	No Multipilot in truck	Rack height select	MP missing		
240	Internal process interrupted	Rack height select	Controller		
250	No height actual value on job input	Rack height select			The height is invalid for the warehouse level entered
252	Rack height select incorrect	Rack height select			
253	Rotary field implausible – transmission overloaded, excess load on incline	F	Controller	None, switch truck off/on	Main contactor opened
254	Diagnostics piracy	Judit Box	None	Create authorisation	No diagnosis possible

## Components

A	C = 064	Display / Operation (LISA / JULIA)
	C = 065	Display / Operation (Else-Check)
	C = 066	Display/Operation (CANCode)
	C = 067	Display (CANDis)
	C = 068	Display/Operation (on board computer)
	C = 3	Comfort display [CANopen]
C		Canion (Atlas Copco) [CANopen]
	C = 1	- Master
	C = 11	- slave
E	C = 8	Electric switch box (E box) / slave
ECU	---	Engine Control Unit (ECU)
F	C = 016	Travel (MP1510C / AS2405F / AS2409K / AS2412F)
	C = 016	Travel 1 (MP1514F / AS4814Fplus)
	C = 017	Travel 2 (MP1514F / AS4814Fplus)
F-AC	C = 016	Travel (AS4812/14F)
	C = 8	ACS Traction (Atlas Copco AC 8011/18, Inmotion) [CANopen]
Travel switch	C = 096	Can-Bus travel switch
H	C = 032	Lift (MP1514H / AS4814Hplus)

H-AC	C = 032	Lift (AS4814H)
	C = 7	ACS Pump (Atlas Copco AC 8011/18, Inmotion) [CANopen]
Rack height select	C = 128	Rack Height Select
I	C = 21	I/O-Board 1 [CANopen]
	C = 22	I/O-Board 2 [CANopen]
	C = 23	I/O-Board 3 [CANopen]
	C = 24	I/O-Board 4 [CANopen]
I2	C = 146	Interface 2
	C = 155	Interface 21
	C = 156	Interface 71
I3	C = 147	Interface 3
I4	C = 148	Interface 4 = MFC_brake
I5	C = 149	Interface 5
I6	C = 150	Interface 6 = MFC_prop
I7	C = 151	Interface 7
I8	C = 152	Interface 8 = MFC_oprion
ISM	C = 069	ISM Access Module
	C = 29	ISM Access Module [CANopen]
	C = 070	ISM-Data recorder
	C = 071	ISM radio module

L	C = 048	Steer (MP1502L / PM2402L / AS4803L)
	C = 048	Steer 1 (AS4803L)
	C = 049	Steer 2 (AS4803L)
	C = 050	Steer 3 (AS4803L)
	C = 4	Steer computer [CANopen]
M	C = 096	Multipilot / Masterpilot
	C = 2	Multipilot / Solopilot [CANopen]
MFH	C = 096	Multifunction lever (ETR)
P	C = 3	Pluto armrest with display and keypad
S	C = 112	Solopilot / Hand lever
T	C = 1	Transmission Control Unit (TCU) = Master

Travel setpoint device: travel potentiometer, accelerator pedal

Steering actual value transmitter: steer potentiometer, proximity switch (on steered wheel)

**ONLY in 1st generation!**

**All messages numbered above 100 come from the interface and correspond to message 1- xx -99!**

 For more details on warnings and information messages refer to the operating instructions.

**Warning / Information Messages**

	INFO 01	SEAT SWITCH_OPEN		
	INFO 02	NO_TRAVEL DIRECTION		
	INFO 03	NO_TRAVEL RELEASE		
	INFO 04	NO_NOMINAL VALUE		
	INFO 05	LIFTING OFF		
	INFO 06	DEADMAN KEY OPEN		
	INFO 07	START_INCORRECT		
	INFO 08	PARKING BRAKE		
	INFO 09	SLOW SPEED		
	INFO 10	TEMPERATURE DRIVE MOTOR		
	INFO 11	TEMP_LIFT_MOTOR		
	INFO 12	TEMP_STEER_MOTOR		
	INFO 13	BRUSH WEAR OUT_DRIVE_MOTOR		
	INFO 14	BRUSH WEAR OUT_LIFT_MOTOR		
	INFO 15	BRUSH WEAR OUT_STEER_MOTOR		
	INFO 16	DRIVING DISABLE		
	INFO 17	LIFT END DIS.		
	INFO 18	SECURITY HEIGHT		
	INFO 19	DOOR OPEN		
	INFO 20	AISLE MODE		
	INFO 21	RESCUE STEERING		
	INFO 22	STEERING MISSING		
	INFO 23	DIAGNOSTIC_MODE		
	INFO 24	SWITCH POWER OFF		
	INFO 25	TEMP_TRAVEL		
	INFO 26	TEMP_LIFT		
	INFO 27	TEMP_STEER		

		INFO 28	SPARE_1		
		INFO 29	DISPLAY SWITCHES THE EXTERNAL BUZZER		
		INFO 30	TWIN PEDAL BOTH APPLIED		
		INFO 31	NO ZERO POSITION		
		INFO 32	NO TRAVERSE REFERENCE ON POWER UP		
		INFO 33	ONLY CRAWL SPEED POSSIBLE AS BATTERY NOT LOCKED		
		INFO 34	ONLY CRAWL SPEED POSSIBLE, AS INFO FROM STEERING CONTROLLER		
		INFO 35	LOW VOLTAGE TRAVEL		
		INFO 36	LOW VOLTAGE LIFT		
		INFO 37	LOW VOLTAGE STEER		
		INFO 40	CHECK MOTOR SENSOR SYSTEM		
		INFO 48	IMPACT EVENT VERTICAL FORCE 1		
		INFO 49	IMPACT EVENT VERTICAL FORCE 2		
		INFO 50	IMPACT EVENT VERTICAL FORCE 3		
		INFO 51	IMPACT EVENT HORIZONTAL FORCE 1		
		INFO 52	IMPACT EVENT HORIZONTAL FORCE 2		
		INFO 53	IMPACT EVENT HORIZONTAL FORCE 3		
		INFO 54	SET TRUCK TYPE		
		INFO 55	REVERSE TRAVEL BUTON NOT PRESSED		
		INFO 56	ERROR FREE LIFT SENSOR		
		INFO 73	CHECK VALVE OUTPUTS		
		INFO 90	TRAVEL AGAINST THE HANDBRAKE		
		INFO 96	NO ZERO POSITION FOR HYDRAULIC CONTROLS		
		INFO 97	ERROR HYDRAULICS		