ZEBRA® Monitor's Message	Description	Cat.	Reset	Possible defective item
AC heater relay	AC heater heats the battery using power from the main line. A relay and a semiconductor switch are used to control the heating. AC heater relay error happens when close relay or open relay commands don't have a successful conclusion DPH_NTB_AC_HEATER_RELAY_ERROR	S	D	Battery BMI
AC heater switch	AC heater heats the battery using power from the main line. A relay and a semiconductor switch are used to control the heating. AC heater switch error happens when close switch or open switch commands don't have a successful conclusion. (Vac<0,7*Vac-off 3 s after closing) (Vac>1,3* Vac-off 3 s after opening or Vac overflow) DPH_NTB_AC_HEATER_SWITCH_ERROR	S	D	Battery BMI
AC switch/relay wrong sequence	AC_ERROR means a wrong sequence on the relay and semiconductor switch chain controlling the AC heater. DPH_NTB_AC_MEAS_ERROR	N	D	BMI
AC voltage overflow	AC supply > 320V for more than 4 s DPH_NTB_AC_OVERFLOW_ERROR	S	I	BMI System
Battery switch off with I > I_OPEN_MAX	During switch off procedure of traction or charger net, main switches opened even if after 4 sec | current | not < roughly20 A (the value of 20A depend on battery voltage and switch model used on bmi) DPH_NTB_LOAD_NOT_DISABLED_ERROR	N	V	System *BMI*
Battery temp. > (360℃ or 340℃)	Battery temperature is too high for more than 9 sec: T average >=361,5℃; reset if <=358,5℃ in old batt . T average >=341,5℃; reset if <=338,5℃ in new batt . DPH_NTB_TEMPHIGH_ERROR	N	I	Battery BMI
Battery thermal isolation	Temperature decreased even if DC heater on since 1 hour; possible thermal losses. (AC off, DC heater on: after 1 hour temp is decreased) (T1 used or T2 if gradient error on T1 and no error on T2) DPH_NTB_THERMAL_ISOLATION_ERROR	N	D	Battery BMI
Battery voltage too high	For more than 1sec Battery Voltage > Voltage Max (CellVoltageMax * NumIntactCells) (CELL_VOLTAGE_MAX= 3,4V) DPH_NTB_MAXVOLT_ERROR	D-OFF	V	BMI System *Battery*
Battery voltage too low	For more than 1sec Battery Voltage < Voltage Min (CellVoltageMin * NumIntactCells; this disable DC heater) (CELL_VOLTAGE_MIN = 1,4V) DPH_NTB_MINVOLT_ERROR	D-OFF	V	Battery BMI System
Bmi Temperature too high	Only A306 apply: For more then 1 sec the "Temp. BMI" was higher the max allowed (90℃ Typ) DPH_NTB_TEMPBMI_ERROR	OFF	D	System

ZEBRA® Monitor's Message	Description	Cat.	Reset	Possible defective item
Chain*Monitor*Unit detected problems	On batteries predisposed for Chain Monitor Unit (in battery setup “Extra connector for CMU” is at true) during charge, at 80%, is done an extra test on one cell voltage of each chain: it must be between min (2,4V/C typ) and max (2,817V/C typ). See “last previous CMU final status test result” for the type of error stored; “Command to power the CMU” is effective only if the disconnection relay is closed. DPH_NTB_BOX_FC_ERROR	OFF	D	Battery - CMU
Charge CAN bus off	Bus off error while reading or writing on chargerCanBus DPH_NTB_CAN_CHARGER_BUSOFF_ERROR	N	I	BMI System
Charge CAN bus warning	Bus warning error while reading or writing on chargerCanBus DPH_NTB_CAN_CHARGER_BUSWARN_ERROR	S	I	BMI System
Charge current too high	For more than 1sec charging current higher than Limit Charge. (CellCurrentLimitCharge*NumString); (Z5/ML3 B1/B2 300V: CELL_CURRENT_LIMIT_CHARGE = 100A) DPH_NTB_MAXCURRENT_CHARGE_ERROR	D-OFF	V	Battery BMI System
Charge not allowed (OCV out of range)	Charge or fast charge isn’t enabled because of a too low or too high battery voltage. (battery voltage <= OCVCellMinCharge * 94% (BchVch) or 96% (Fch)* NumCelllOkPerString); or (battery voltage > 2,7V/C)* NumCelllOkPerString) (OcvCellMinCharge is SOC depending) DPH_NTB_CHARGING_OCV_ERROR	N	I	Battery BMI
BMI's pwm out shorted	Only with charger managed with PWM: found a short on BMI PWM output line (pin 12) (PWM value controls charger's current) (set if short detected for more than 1 min) (reset if not verified for 1min) DPH_NTB_CHARGER_OVERTEMP_ERROR	N	I	BMI System
Charge stopped for EOC with low temperature P cells	If an EOC condition is detected with T < 233,5℃; Only with cell MLP or MLX Heating up executed before reenable charge. DPH_NTB_LOW_TEMP_EOC_PCELLS_ERROR	N - S (On req. Autod.)	I	
Charger not provide current (2A)even if PWM > 90%	After 10 sec with less then 2A even if PWM > 90%; the PWM for chargers is zeroed for 2 min. to cool the charger after the set of the error. DPH_NTB_CHARGER_PROVIDE_NO_POWER_ERROR	S	I	BMI System
Charging current too low (for 5 min)	No connection with charger detected: charger not connected or not working properly. (If |charging current| < 240mA per string continuosly for more than 5 minutes, timer start from beginning if DcDC is enabled) DPH_NTB_CHARGING_CURR_ERROR	N	V	BMI *Battery* System

ZEBRA® Monitor's Message	Description	Cat.	Reset	Possible defective item
Charging temp waiting OK	Charge stopped due to wrong temperature: Typically-> - If T>T (Soc) where T (Soc) is: 285℃ for SOC < 20% (fan present),315℃ for SOC <20 % (fan not present), 305℃ for SOC = 50%, 285℃ for SOC > 80% (fan present) , 275℃ for SOC > 80% (fan present) . - If T< 235℃ DPH_NTB_CHARGING_TEMP_ERROR	N - S (On req. Autod.)	I	
Coil S2	Main switch S2 closed, but coil current >1,5A or <0,4A. DPH_NTB_S2_ERROR	OFF	V	BMI
Coil S3	Main switch S3 closed, but coil current >1,5A or <0,4A. DPH_NTB_S3_ERROR	OFF	V	BMI
Crash	Crash sensor active (pin 14 of AMP6 connector, and 6 optionally) DPH_NTB_CRASH_ERROR	OFF	D - V (on req. A306)	BMI
DC heater error	DC heater current is checked, error set if : for more than 9 sec DC heater on and I < 0,5 I nominal. The control is made with disconnection relay close. The DIS relay isn't opened by this error. Dc heater disabled if voltage lower than 2,38V/Cell for 1 min. DPH_NTB_DC_HEATER_ERROR	N	I	Battery BMI
DC heater emergency	The LV controller received the Status Word indicating DC heater emergency switch off activated (OVC) HV controller detected DC heater current > 5A DPH_NTB_DC_HEATER_EMERGENCY_SWITCH_OFF	N	I	Battery BMI
DC heater out of control	DC heater current is checked, error set if : for more than 9 sec, DC heater off and I > 0,5 Inominal or for more than 9 sec, Dcheater on and I > 2 Inominal or for more than 9 sec, Dcheater current < -1/10 Inominal The DISconnection relay will be opened. With DIS open charge or discharge aren't possible, because isn't possible read battery voltage; the only way to keep warm the battery is AC heater. The control is made with disconnection relay close. DPH_NTB_DC_HEATER_OUT_OF_CONTROL_ERROR	N	I	Battery BMI

ZEBRA® Monitor's Message	Description	Cat.	Reset	Possible defective item
Difference T1 - T2 too high	After 2 hours of continuous AC or DC heating: the temperatures, reads by 2 temperature sensors, with too high difference ->AcHeatingReduced. Both T1> T2 +D both T1<T2 + D can set th error. The delta (D) depends on the battery type. For Digatron application, the error can be set also during the test to check T1 and T2 swapped. DPH_NTB_DIFF_T1T2_ERROR	N	I	Battery BMI
Discharge current too high	For more than 60msec discharging current bigger than Current Limit Discharge. (CellCurrentLimitDischarge*NumString) (ML3: CELL_CURRENT_LIMIT_DISCHARGE = 140A) DPH_NTB_MAXCURRENT_DISCHARGE_ERROR	N	V	BMI System
Discharging temp waiting OK	The Battery temperature doesn't allow to discharge the battery (for discharge and/or external DcDc) : both low or high temperature can produce this error. DPH_NTB_DISCHARGING_TEMP_ERROR	N	I	
Disc.Relay open due to Tbatt.low (<210℃ Typ)	Battery temperature is too low. (For more than 9 sec: T average <=208.5℃; error is reset immediately if Tav >=210℃) DPH_NTB_TEMPCOLD_ERROR	N	I	
Emergency	Power supply on Emergency pin (pin 9 of AMP16 connector) has been removed (lower than 8V/16V), for more than 1 s. (if pin 2 (reset input) is active, emergency error is not set) DPH_NTB_EMERGENCY_ERROR	OFF	V	BMI System
End of charge with SOC too low: New charge disabled (Typ. 80%)	End of charge reached with SOC < 80%. SW calculated SOC can be different (lower in this case) than real SOC. To set a well known value of SOC an end of charge must takes place: one EOC per day is recommended (Soc + int offset < 80% has been detected). For both C and P cells stop any type of charge. DPH_NTB_EOC_WITH_SOC_TOO_LOW_ERROR	N	D	Battery BMI System
End of charge has not been reached for a long time	For 36 hours (or 180 hours in A306), end of charge has not been reached: please don't stop charge and wait end of charge. In application using 36h, the error is showed only if AC is applied. DPH_NTB_INT_OFFSET_TIME_BIG_ERROR	N	I	Battery BMI System
External ISO	Each 10 min an isolation test is made: if S2 was close when the test started the error is considered external. One of the battery poles is shorted to the chassis or anything on the traction net or charge net produce the error because of connected to chassis. Discharge is permitted but not charge and not regeneration. In multi-battery system the MBS send a message to start the test. Test made with disconnection relay close and without reset. Threshold to set the error 10Ohm/Vocv (or 500Ω/V on demand) with a min of (Bmi 100V):<13K, (Bmi 160V):<13K, (Bmi 300V):<38, (Bmi 600V): <75K DPH_NTB_EXT_ISO_ERROR	D-OFF (9 min if 1th error)	I	BMI System
External iso error set too often: check wiring please	External iso error has been reset for more than 20 times. There are no more automatic attempts of remove it after 216 times, but it is necessary to provide a positive edge on the ignition signal to restart the verification cycle: if external iso error is set the ignition is not able to close the switches but can only start the iso verification cycle. DPH_NTB_EXT_REMVED_ISO_ERR	N	I	BMI System

ZEBRA® Monitor's Message	Description	Cat.	Reset	Possible defective item
End of discharge detected	End Of discharge algorithm detected battery discharge. DPH_NTB_END_OF_DISCHARGE_DETECTED_ERROR	N	I	
Fan error	If fan command active: error set if for more than 2 sec fan current > 8A or If fan command not active: error set if for more than 2 sec fan current > 2A DPH_NTB_FAN_OUTPUT_ERROR	N	V	BMI System
Gradient on temp sensor 1 too high	Gradient on temp sensor 1 too high (For more than 9 sec: | T1 gradient | > 12℃/min) DPH_NTB_T1_GRAD_ERROR	N	V	Battery BMI
Gradient on temp sensor 2 too high	Gradient on temp sensor 2 too high (For more than 9 sec: | T2 gradient |> 12℃/min) DPH_NTB_T2_GRAD_ERROR	N	V	Battery BMI
HV status CE	The LV controller received the Status Word indicating CPU error (RAM/ROM etc.) DPH_NTB_HV_STS_CE_ERROR	S	V	BMI
HV status CS	The LV controller received the Status Word indicating checksum error in the last optobus protocol DPH_NTB_HV_STS_CS_ERROR	S	V	BMI
HV status E0	The LV controller received the Status Word indicating checksum error at calibration data page 1 (The word2 of the message received is the status word because previous command message sent to HV controller asked status word) DPH_NTB_HV_STS_E0_ERROR	S	V	BMI
HV status E1	The LV controller received the Status Word indicating checksum error at characteristic data page 1 DPH_NTB_HV_STS_E1_ERROR	S	V	BMI
HV status E2	The LV controller received the Status Word indicating checksum error at calibration data page 2 DPH_NTB_HV_STS_E2_ERROR	S	V	BMI
HV status E3	The LV controller received the Status Word indicating checksum error at characteristic data page 2 DPH_NTB_HV_STS_E3_ERROR	S	V	BMI
HV status LV	The LV controller received the Status Word indicating HV supply voltage is to low DPH_NTB_HV_STS_LV_ERROR	S	V	BMI
HV status WE	The LV controller received the Status Word indicating error during EEPROM access DPH_NTB_HV_STS_WE_ERROR	S	V	BMI

ZEBRA® Monitor's Message	Description	Cat.	Reset	Possible defective item
HV uC supply checksum	The received message indicates that the value of the supply voltage of HV controller isn't available because of: Incorrect checksum DPH_NTB_MSP_VOLTAGE_CHECKSUM_HV_ERROR	S	V	BMI
HV uC supply command unknown	The received message indicates that the value of the supply voltage of HV controller isn't available because of: Unknown command DPH_NTB_MSP_VOLTAGE_COMMAND_UNKNOWN_HV_ERROR	S	V	BMI
HV uC supply HW failure	The received message indicates that the value of the supply voltage of HV controller isn't available because of: Hardware error DPH_NTB_MSP_VOLTAGE_HARDWARE_HV_ERROR	S	V	BMI
HV uC supply no calibration	The received message indicates that the value of the supply voltage of HV controller isn't available because of: No calibration data available DPH_NTB_MSP_VOLTAGE_NO_CALIBRATION_HV_ERROR	S	V	BMI
HV uC supply not available	The LV controller received a message indicating that the value is not (yet) available. The analog value of the supply voltage of HV controller is requested each 640ms. The HV controller isn't able to send the requested analog value. (The word2 of the message received on LV controller is the value of the supply voltage of HV controller because previous command message sent to HV controller asked the supply voltage of HV controller. DPH_NTB_MSP_VOLTAGE_NOT_AVAILABLE_HV_ERROR	S	V	BMI
HV uC supply timeout	The received message indicates that the value of the supply voltage of HV controller isn't available because of: Protocol timeout generated by the LV controller DPH_NTB_MSP_VOLTAGE_TIMEOUT_HV_ERROR	S	V	BMI
HV uC supply too high	The received message indicates that the value of the supply voltage of HV controller is too high. V > 15V DPH_NTB_MSP_VOLTAGE_TOO_HIGH_HV_ERROR	S	V	BMI
HV uC supply too low	The received message indicates that the value of the supply voltage of HV controller is too low. V < 0V DPH_NTB_MSP_VOLTAGE_TOO_LOW_HV_ERROR	S	V	BMI
Internal ISO	Each 10 min an isolation test is made: if S2 was open when the test started the error is considered internal. One of the battery poles is shorted to the chassis. Charge or discharge are disabled because can be unsafe and dangerous for the battery: an accurate analysis must be done by authorized technician. In multi-battery system the MBS send a message to start the test. Test made with disconnection relay close and without reset. Threshold to set the error 10Ohm/Vocv (or 500Ω/V on demand) with a min of (Bmi 100V):<13K, (Bmi 160V):<13K, (Bmi 300V):<38, (Bmi 600V): <75K. (*1*) =the error can be automatically cleared before it becomes definitive DPH_NTB_INT_ISO_ERROR	OFF	D- (*1*)	Battery BMI
in msg 0x310 received bit of PCU error = active	Only A306 apply: The PCU sent to the BMI a notification of one error inside the PCU. DPH_NTB_PCU_FAULT_ERROR	N	I	

ZEBRA® Monitor's Message	Description	Cat.	Reset	Possible defective item
Invalid Battery ID in flange	During initialisation the BMI reads an invalid Battery ID in the flange. (Many battery's parameters are with wrong value if th eerror appears after a sw download) DPH_NTB_INVALID_BATTERY_ID_ERROR	N	I	BMI Battery flange
ISO (-)"	In isolation circuit: error found in U- test cycle (measurement overflow) DPH_NTB_ISO_NEG_ERROR	N	V	BMI
ISO (+)	In isolation circuit: error found in U+ test cycle (measurement overflow) DPH_NTB_ISO_POS_ERROR	N	V	BMI
ISO 1 - Battery not grounded	In isolation circuit: no ground connection or error (ISO_SELFTEST1ERR & ISO_SELFTEST2ERR) DPH_NTB_ISO_SELFTEST1_ERROR	N	V	BMI System
ISO 2 - Battery not grounded	In isolation circuit: no ground connection or error (ISO_SELFTEST1ERR & ISO_SELFTEST2ERR) DPH_NTB_ISO_SELFTEST2_ERROR	N	V	BMI System
ISO 3 - HV resistors or relay"	In isolation circuit: error HV connection relays or resistor network DPH_NTB_ISO_SELFTEST3_ERROR	N	V	BMI
ISO hardware	In isolation circuit: hardware error (ISO_HARDERR returned by get_isotest) DPH_NTB_ISO_HARD_ERROR	N	V	BMI
ISO measurement unstable	In isolation circuit: measurement signal unstable, can't find settling point DPH_NTB_ISO_TIMEOUT_ERROR	N	V	Battery BMI System
ISO test circuit not supplied	In isolation circuit: no power DPH_NTB_ISO_NOPWR_ERROR	N	V	
LDM communication	In the communication with flange detected problem -> check correct communication with the flange. “LDM communication ": Lifedata communication error occurred while testing entry. It happens only after 10s time long communication problem: it resets “LDM Data Busy ". It isn't set if “LDM communication (init failed) “error is already set! (DATA_COMERROR) DPH_NTB_LDM_DATACOMM_ERROR	D-OFF	D	BMI Battery flange
LDM communication (init failed)	LDM data were not loaded properly from the flange or has been read Nameplate Capacity equal to zero from the flange -> check correct communication with the flange. It isn't resettable by vehicle-ignition key or by ZEBRA® Monitor's reset errors! *Resettable only by a BMI's reset.* " LDM communication (init failed) ": Entry could not be read at initialisation, RAM mirror is invalid (DATA_INITERROR) DPH_NTB_LDM_COMMUNICATION_ERROR	D-OFF	I - (BMI’s Reset to clear)	BMI Battery flange

ZEBRA® Monitor's Message	Description	Cat.	Reset	Possible defective item
LDM Data Busy	Warning, temporary problems in the communication with the flange, the communication is still running. It is reset in case of DATA_GOOD, DATA_ERROR, DATA_COMERROR. (DATA_BUSY_ERROR) DPH_NTB_LDM_DATA_BUSY_ERROR	N	I	BMI Battery flange
LDM data check failed	Wrong flange data detected: -> check correct communication with the flange and/or flange integrity. Lifedata EEPROM value in flange and RAM mirror value are not equal. This error clears “LDM Data Busy " error. Check "Handle For LDM data Check Failed". (DATA_ERROR) DPH_NTB_LDM_DATA_ERROR	N	D	BMI Battery flange
LDM write data failed	Error is set if the write operation is not successful within 5 sec. NOTE: Each 5 min SOC is written on LDM, if changed. DPH_NTB_LDM_WRITE_FAILED_ERROR	N	I	BMI Battery flange
Limitation imposed from ZEBRA® to drive system	Reduction on max discharge or regenerative current for inverter or block of charge. Reasons can be: Tmax >290℃, or Soc < 20% or Soc < 17% for ML8 cells , or external ISO error detected, or RegSoc > 2%, or current>200A and energy>330A^{2}min or S3 melted; in charge the reason can be also OCV out of allowed range for charge. DPH_NTB_BATTERY_LIMITATION_ACTIVE_ERROR	S	I	
Long dev. curr charge)	For more than <integral-cumulative timer> 60sec (10 sec in disch in same applications): Battery current > Current max Charge + 10% (+0% in same appl.) In charge or if SOCregn < 2%, the error is set with more then 2A. DPH_NTB_LONGDEVIATION_CURRENT_CHARGE_ERROR	D-OFF	V	System Battery
Long dev. curr discharge	For more than <integral-cumulative timer> 5minutes: Battery current > Current max discharge In BMI 100V-160V the error is set with more then 4A In BMI 300V-600V the error is set with more then 2,5A DPH_NTB_LONGDEVIATION_CURRENT_DISCHARGE_ERROR	D-OFF	V	System
Long dev. voltage max	For more than <integral-cumulative timer> 10sec (or 30s if charger connected on traction net): Battery voltage > Voltage MaxCharge during discharge Battery voltage > Voltage MaxCharge +1% during DC-DC activation Battery voltage > Voltage MaxCharge + 1% during CH or FCH. DPH_NTB_LONGDEVIATION_VOLTAGE_MAX_ERROR	D-OFF	V	Battery System
Long dev. voltage min	For more than <integral-cumulative timer> 20sec Battery voltage < Voltage Min Discharge DPH_NTB_LONGDEVIATION_VOLTAGE_MIN_ERROR	D-OFF	V	Battery System

ZEBRA® Monitor's Message	Description	Cat.	Reset	Possible defective item
Main switch on positive pole could be melted	Main switches on positive and negative pole of the battery could be melted: service Investigation on the main switches is necessary if the error remains. Charge and regeneration are not allowed with this error. DPH_NTB_S3_MELTED_ERROR	N	I	BMI
Main switch supply	Power supply for the main switches S2 or S3 is to low (during and after precharge) Voltage too low on pin 11 of AMP 16 connector. DPH_NTB_SWITCH_SUPPLY_ERROR	OFF	V	BMI
Main switch wrong seq. 1	Precharge is running before the beginning of precharge procedure DPH_NTB_SWITCH_TIMING_ERROR1	OFF	V	BMI
Main switch wrong seq. 2	S2 and S3 ON (drive) before the beginning of precharge procedure DPH_NTB_SWITCH_TIMING_ERROR2	OFF	V	BMI
Main switch wrong seq. 3	S2 and S4 ON (charge) before the beginning of precharge procedure DPH_NTB_SWITCH_TIMING_ERROR3	OFF	V	BMI
Main switch wrong seq. 4	S2, S3 and S4 ON (drive & charge) before the beginning of precharge procedure DPH_NTB_SWITCH_TIMING_ERROR4	OFF	V	BMI
Main switch wrong seq. 5	Precharge is running after the end of precharge DPH_NTB_SWITCH_TIMING_ERROR5	OFF	V	BMI
Main switch wrong seq. 6	Precharge error (timeout) after the end of precharge DPH_NTB_SWITCH_TIMING_ERROR6	OFF	V	BMI
Manual switch-off performed	SW off error has been set with ZEBRA® monitor for diagnostic-test purpose DPH_NTB_SW_OFF_ZMONITOR_ERROR	OFF	D	BMI
Max delta FC has been exceeded for too long time	See “Warranty status" in page Battery Lifedata. The BMI received, for more then 6 days, from MBS, a message to inform that the difference, among all the batteries, between the max and min n° of failed cell per string exceed ed the max allowed. Once set this flag remains set even if the difference becomes acceptable. DPH_NTB_DELTA_FC_ERROR	S	I	System
MBS CAN communication	In multi-battery system the BMI must receive, continuously, within 5 s (while no bus errors), from the MBS, on battery can, a message of system enable: if this doesn't happen "MBS CAN communication" error is set. (on OFF to ON transition of the ignition signal, the BMI close switches without this message, but, after 5 sec they are opened if BMI doesn’t receive the system enable) DPH_NTB_CAN_MBS_TIMEOUT_ERROR	S	I	BMI System
MBS requires disconnection (to execute isolation test or other)	In case of isolation test or other, the MBS requires the disconnection of all the BMIs in order to execute the internal isolation test. DPH_NTB_MBS_DISCON_REQ_ERR	OFF	I	

ZEBRA® Monitor's Message	Description	Cat.	Reset	Possible defective item
Measure DC heater curr too low	The received analog value of DC heater current indicates that the value is too high; for 60ms. I < 0 A DPH_NTB_DCHEATCURR_TOO_LOW_HV_ERROR	N	V	Battery BMI
Meas current HW failure	The received analog value of battery current indicates that the value is not available because of hardware problems; for 60ms. DPH_NTB_CURRENT_HARDWARE_HV_ERROR	OFF	V	BMI
Measured current checksum	The received analog value of battery current indicates that the value is not available because of checksum error; for 60ms. DPH_NTB_CURRENT_CHECKSUM_HV_ERROR	OFF	V	BMI
Measured current command unknown	The received analog value of battery current indicates that the value is not available because the HV controller didn't recognise the command received; for 60ms. DPH_NTB_CURRENT_COMMAND_UNKNOWN_HV_ERROR	OFF	V	BMI
Measured current no calibration	The received analog value of battery current indicates that the value is not available because of no calibration available; for 60ms. DPH_NTB_CURRENT_NO_CALIBRATION_HV_ERROR	OFF	V	BMI
Measured current not available	The received analog value of current voltage indicates that the value isn't (yet) available; for 60ms. (Analog value (of current voltage, from HV controller) is: not (yet) available. The value or battery current is sent, by HV controller, approximately each 20 ms). The HV controller isn't able to send the requested analog value. DPH_NTB_CURRENT_NOT_AVAILABLE_HV_ERROR	OFF	V	BMI
Measured current timeout	The received analog value of battery current indicates that the value is not available because of time out error generated from LV; for 60ms. DPH_NTB_CURRENT_TIMEOUT_HV_ERROR	OFF	V	BMI
Measured current too high	The received analog value of battery current indicates that the value is too high; for 60ms. I > 500A DPH_NTB_CURRENT_TOO_HIGH_HV_ERROR	OFF	V	BMI
Measured current too low	The received analog value of battery current indicates that the value is too low; for 60ms. I < -400A DPH_NTB_CURRENT_TOO_LOW_HV_ERROR	OFF	V	BMI
Measured DC heater curr checksum	The received analog value of DC heater current indicates that the value is not available because of checksum error; for 60ms. DPH_NTB_DCHEATCURR_CHECKSUM_HV_ERROR	N	V	BMI
Measured DC heater curr command unknown	The received analog value of DC heater current indicates that the value is not available because the HV controller didn't recognise the command received; for 60ms. DPH_NTB_DCHEATCURR_COMMAND_UNKNOWN_HV_ERROR	N	V	BMI
Measured DC heater curr no calibration	The received analog value of DC heater current indicates that the value is not available because of no calibration available; for 60ms. DPH_NTB_DCHEATCURR_NO_CALIBRATION_HV_ERROR	N	V	BMI

ZEBRA® Monitor's Message	Description	Cat.	Reset	Possible defective item
Measured DC heater curr not available	The received analog value of DC heater current indicates that the value isn't (yet) available; for 480ms. The analog value of DC heater current is requested each 160ms. The HV controller isn't able to send the requested analog value. (The word2 of the message received on LV controller is the value of DC heater current because previous command message sent to HV controller asked DC heater current) DPH_NTB_DCHEATCURR_NOT_AVAILABLE_HV_ERROR	N	V	BMI
Measured DC heater curr timeout	The received analog value of DC heater current indicates that the value is not available because of time out error generated from LV; for 60ms. DPH_NTB_DCHEATCURR_TIMEOUT_HV_ERROR	N	V	BMI
Measured DC heater curr too high	The received analog value of DC heater current indicates that the value is too high; for 1s. I > 7,5A (100V-160V)or 2,5A (300V-600V) DPH_NTB_DCHEATCURR_TOO_HIGH_HV_ERROR	N	V	BMI
Measured DC heater HW failure	The received analog value of DC heater current indicates that the value is not available because of hardware error; for 60ms. DPH_NTB_DCHEATCURR_HARDWARE_HV_ERROR	N	V	BMI
Measured smoothcap voltage checksum	The received analog value of smoothcap voltage indicates that the value is not available because of checksum error; for 60ms. DPH_NTB_SMOOTHCAPV_CHECKSUM_HV_ERROR	OFF	V	BMI
Measured smoothcap voltage command unknown	The received analog value of smoothcap voltage indicates that the value is not available because the HV controller didn't recognize the command received; for 60ms. DPH_NTB_SMOOTHCAPV_COMMAND_UNKNOWN_HV_ERROR	OFF	V	BMI
Measured smoothcap voltage HW failure	The received analog value of smoothcap voltage indicates that the value is not available because of hardware error; for 60ms. DPH_NTB_SMOOTHCAPV_HARDWARE_HV_ERROR	OFF	V	BMI
Measured smoothcap voltage no calibration	The received analog value of smoothcap voltage indicates that the value is not available because of no calibration available; for 60ms. DPH_NTB_SMOOTHCAPV_NO_CALIBRATION_HV_ERROR	OFF	V	BMI
Measured smoothcap voltage not available	The received analog value of smoothcap voltage indicates that the value isn't (yet) available; for 120ms. The analog value of smoothcap voltage is requested each 40ms. The HV controller isn't able to send the requested analog value. (The word2 of the message received on LV controller is the value of smoothcap voltage because previous command message sent to HV controller asked smoothcap voltage) DPH_NTB_SMOOTHCAPV_NOT_AVAILABLE_HV_ERROR	OFF	V	BMI

ZEBRA® Monitor's Message	Description	Cat.	Reset	Possible defective item
Measured smoothcap voltage timeout	The received analog value of smoothcap voltage indicates that the value is not available because of time out error generated from LV; for 60ms. DPH_NTB_SMOOTHCAPV_TIMEOUT_HV_ERROR	OFF	V	BMI
Measured smoothcap voltage too high	The received analog value of smoothcap voltage indicates that the value is too high; for 60ms. V > 800 V DPH_NTB_SMOOTHCAPV_TOO_HIGH_HV_ERROR	OFF	V	BMI System
Measured smoothcap voltage too low	The received analog value of smoothcap voltage indicates that the value is too high; for 60ms. V < 0 V DPH_NTB_SMOOTHCAPV_TOO_LOW_HV_ERROR	OFF	V	BMI System
Measured temp. Checksum	The received analog value of temperature indicates that the value is not available because of checksum error; for 60ms. DPH_NTB_TEMPERATURE_CHECKSUM_HV_ERROR	N	V	BMI
Measured temp. command unknown	The received analog value of temperature indicates that the value is not available because the HV controller didn't recognise the command received; for 60ms. DPH_NTB_TEMPERATURE_COMMAND_UNKNOWN_HV_ERROR	N	V	BMI
Measured temp. HW failure	The received analog value of smoothcap voltage indicates that the value is not available because of hardware error; for 60ms. DPH_NTB_TEMPERATURE_HARDWARE_HV_ERROR	N	V	BMI
Measured temp. not available	The received analog value of temperature (battery and BMS temperature) indicates that the value isn't (yet) available; for 1920ms. The analog value of temperature is requested each 640ms. The HV controller isn't able to send the requested analog value. Periodically T1, T2 and TBMS are requested to HV controller; only one value each time. (The word2 of the message received on LV controller is the value of temperature because previous command message sent to HV controller asked temperature) DPH_NTB_TEMPERATURE_NOT_AVAILABLE_HV_ERROR	N	V	BMI
Measured temp. no calibration	The received analog value of temperature indicates that the value is not available because of no calibration available; for 60ms. DPH_NTB_TEMPERATURE_NO_CALIBRATION_HV_ERROR	N	V	BMI
Measured temp. Timeout	The received analog value of temperature indicates that the value is not available because of time out error generated from LV; for 60ms. DPH_NTB_TEMPERATURE_TIMEOUT_HV_ERROR	N	V	BMI
Measured temp. too high	The received analog value of temperature indicates that the value is too high; for 60ms. T1,T2 > 400℃; TBMS> 150℃ DPH_NTB_TEMPERATURE_TOO_HIGH_HV_ERROR	N	V	BMI

ZEBRA® Monitor's Message	Description	Cat.	Reset	Possible defective item
Measured temp. too low	The received analog value of temperature indicates that the value is too high; for 60ms. T1, T2 < -40℃; TBMS< -40℃ DPH_NTB_TEMPERATURE_TOO_LOW_HV_ERROR	N	V	BMI
Measured voltage checksum	The received analog value of battery voltage indicates that the value is not available because of checksum error; for 60ms. DPH_NTB_VOLTAGE_CHECKSUM_HV_ERROR	OFF	V	BMI
Measured voltage command unknown	The received analog value of battery voltage indicates that the value is not available because the HV controller didn't recognise the command received; for 60ms. DPH_NTB_VOLTAGE_COMMAND_UNKNOWN_HV_ERROR	OFF	V	BMI
Measured voltage HW failure	The received analog value of battery voltage indicates that the value is not available because of hardware error; for 60ms. DPH_NTB_VOLTAGE_HARDWARE_HV_ERROR	OFF	V	BMI
Measured voltage no calibration	The received analog value of battery voltage indicates that the value is not available because of no calibration available; for 60ms. DPH_NTB_VOLTAGE_NO_CALIBRATION_HV_ERROR	OFF	V	BMI
Measured voltage not available	The received analog value of battery voltage indicates that the value isn't (yet) available; for 60ms. (Analog value (of battery voltage, from HV controller) is: not (yet) available. The value or battery voltage is sent, by HV controller, approximately each 20 ms) The HV controller isn't able to send the requested analog value. DPH_NTB_VOLTAGE_NOT_AVAILABLE_HV_ERROR	OFF	V	BMI
Measured voltage timeout	The received analog value of battery voltage indicates that the value is not available because of time out error generated from LV; for 60ms. DPH_NTB_VOLTAGE_TIMEOUT_HV_ERROR	OFF	V	BMI
Measured voltage too high	The received analog value of battery voltage indicates that the value is too high; for 60ms. V > 800V DPH_NTB_VOLTAGE_TOO_HIGH_HV_ERROR	OFF	V	BMI
Measured voltage too low	The received analog value of battery voltage indicates that the value is too low; for 60ms. V < 0V DPH_NTB_VOLTAGE_TOO_LOW_HV_ERROR	OFF	V	Battery BMI
OCV obtained during charge has problem, check consistency	The open circuit voltage computed during charge, each 1%SOC by temporary reduction of charge, present possible anomalies. For details of the cause of the fault see, in Monitoring page: “OCV results; Double Click on Var to Show complete Status”. N°Of failed cell seems decreased, the 2 n°of fail ed cell with difference higher then 1, possible broken string or high resistance inside of the battery. DPH_NTB_MAYBE_NEW_FAILED_CELL_ERROR	S	V	Battery BMI

ZEBRA® Monitor's Message	Description	Cat.	Reset	Possible defective item
On-board battery voltage<12V/24V	The on-board battery is not properly charged. Check the right DCDC functionality. DPH_NTB_LOW_VOLT_ERROR	N	I	System
Peak dev. current charge	For more than 10 continuously sec: (20s if charger connected on traction net and 1sec in discharge in same appl) Battery current > Current MaxCharge + 50% during CH or FCH. Battery current > Current MaxCharge + 30% (+10% is same appl) during discharge In charge or if SOCregn < 2%, the error is set with more then 2A. (Procedure disabled for 2sec when DC heater start to discharge battery to measure OCV) DPH_NTB_PEAKDEVIATION_CURRENT_CHARGE_ERROR	D-OFF	V	System
Peak dev. current discharge	For more than 30 continuously sec: Battery current > Current MaxDischarge + 10% In BMI 100V-160V the error is set with more then 4A In BMI 300V-600V the error is set with more then 2,5A DPH_NTB_PEAKDEVIATION_CURRENT_DISCHARGE_ERROR	D-OFF	V	System
Peak dev. voltage max	For more than < integral-cumulative timer > 2sec (0,5s in discharge is same application): Battery voltage > Voltage MaxCharge + 5% DPH_NTB_PEAKDEVIATION_VOLTAGE_MAX_ERROR	D-OFF	V	Battery System
Peak dev. voltage min	For more than <integral-cumulative timer> 2sec Battery voltage < Voltage MinDischarge - 10% DPH_NTB_PEAKDEVIATION_VOLTAGE_MIN_ERROR	D-OFF	V	Battery System
Please check number of failed cells: it is too high->could stop the batt.	The number of failed cells detected from the BMI is too high, typically more then 10%. The battery can have a high number of failed cells and need to be repaired. DPH_NTB_MAX_FC_CELL_ERR	N	I	Battery
Precharge HW error	If during precharge (on traction or charge net) precharge thystors fail: current on it even if it hasn't been activated. BMI's hw must be replaced or tested carefully. DPH_NTB_PRECHARGE_HW_ERROR	S	D	BMI
Precharge resistors	During precharge procedure on traction or charge net, energy in precharge resistor exceeds max value (Energy = Σi^2R). A delay (1÷2 min) must occur before restart a new precharge in order to let to dissipate energy accumulated on the precharge resistor. DPH_NTB_PRECHARGING_ERROR	OFF	V	BMI System

ZEBRA® Monitor's Message	Description	Cat.	Reset	Possible defective item
Precharge time elapsed	Precharge sequence on traction net not finished in max time of 1 sec. (for traction net: not reached, on precharging capacitors, 0,95% of battery voltage) (for charging net: precharge procedure not finished in maximum time of 0,5 sec) Check / try to reduce the value of the capacitors and loads connected on traction-charge net that must be precharged and/or check the number of battery connected in a multy battery system in order to reduce the probability to arise this error. DPH_NTB_PRECHARGE_TIME_ERROR	OFF	V	BMI System
Short circuit	For more than 60msec: Battery Voltage < 1,3 V per good cell in one chain OR discharging current > 270A per chain with ML3 cell (> 115A per chain with ML8 cell) DPH_NTB_BATT_SHORT_ERROR	OFF	D	Battery System BMI
SOC too high: Warning Check SOC consistency! (Typ. 103,8)	Calculated SOC >103,8%; in charge, after depolarization with DC heater, the SOC can be set to 100% for max 4 times. DPH_NTB_SOC_HIGH_ERROR	N	D	Battery System BMI
SOC too high: Reset BMI and then Discon. relay kept open (Typ. 103,9%)	Calculated SOC >103,9%, SOC is set to 103,9% and disconnection relay is opened! With DIS open charge or discharge aren't possible, because isn't possible read battery voltage; DC heater is also disabled with DIS open. The only way to keep warm the battery is AC heater. DPH_NTB_EOC_WITH_SOC_TOO_HIGH_ERROR	D-OFF	D	Battery System BMI
Switch coil open circuit error	Open coil circuit at any main switch DPH_NTB_SWITCH_COIL_OPEN_CIRCUIT_ERROR	N	V	BMI
Switch coil shortcut error	Coil shortcut at any main switch DPH_NTB_SWITCH_COIL_SHORTCUT_ERROR	OFF.	V	BMI
Switch overtemp error	Overtemperature at any main switch: check cable connection between the two mechanic part of BMI. DPH_NTB_SWITCH_OVERTEMP_ERROR	N	V	BMI
Switch under load (I > 50A)	During switch off procedure of traction or charger net, main switches opened even if after 8 sec current > 50A. Charge and discharge are disabled DPH_NTB_SWITCH_UNDER_LOAD_ERROR	N	D	System

ZEBRA® Monitor's Message	Description	Cat.	Reset	Possible defective item
T1 not available error	If for more than 9 sec, the LV controller receives T1 = not available. If T2 is available then T1=T2 . If also T2 is not available DIS relay is opened. DPH_NTB_T1_NOT_AVAILABLE_ERROR	N	V	Battery BMI
T2 not available error	If for more than 9 sec, the LV controller receives T2 = not available. If T1 is available then T2=T1. If also T1 is not available DIS relay is opened. DPH_NTB_T2_NOT_AVAILABLE_ERROR	N	V	Battery BMI
Temp. fatal	At least one sensor is out of range (-40℃..+355℃) or both the temperature sensors gradients are out of range (> 12℃/min). After having set this error the BMI is reset.!! DPH_NTB_TEMP_FATAL_ERROR	D-OFF	D	Battery BMI
Temp. sensor 1 out of range	Temp. Sensor 1 out of range. For more than 9 sec: T1 < -40℃ or T1 > 355℃, with temperature sensors in front position, in new batteries. (For more than 9 sec: T1 < -40℃ or T1 > 380℃, wit h temperature sensors in central position) DPH_NTB_T1_ERROR	N	V	Battery BMI
Temp. sensor 2 out of range	Temp. Sensor 2 out of range. For more than 9 sec: T1 < -40℃ or T1 > 355℃, with temperature sensors in front position, in new batteries. (For more than 9 sec: T1 < -40℃ or T1 > 380℃, wit h temperature sensors in central position) DPH_NTB_T2_ERROR	N	V	Battery BMI
timeout error: 0x310 msg not received for 1 sec while in discharge or in charge	Only A306 apply: problems on BMI and PCU communication DPH_NTB_CAN_310_TIMEOUT_ERROR	OFF	I	System
timeout error: 0x311 msg not received for 1 sec while in charge	Only A306 apply: problems on BMI and PCU communication DPH_NTB_CAN_311_TIMEOUT_ERROR	OFF	I	System
Time max elapsed while AC heating	AC heater doesn't heat properly or thermal losses: T1 below 200℃ for more than 22 hours -28hours for Z12. -22 or 28h with Vac>150V & AC heater on with max power. DPH_NTB_AC_HEATER_ONTIME_ERROR	N	D	Battery BMI
Time out for OCV meas (t > 60min)	During Vehicle and Battery charge, when SOC reaches 80%, a measure of OCV takes place: before measuring OCV the DC heater must discharge the battery of 0,3%. Discharge and measure must happen in max 60min: the message shows that it didn't happen. If DCheater doesn't discharge after 15min charge restarts. DPH_NTB_OCV_MEASUREMENT_ERROR	N	V	Battery BMI
Ubatt too low for ISO test	In isolation circuit: low battery voltage DPH_NTB_ISO_LOBAT_ERROR	N	V	Battery BMI
Vehicle crash	Crash signal from the server or from the vehicle DPH_NTB_VCL_CRASH_ERROR	OFF	V	System

ZEBRA® Monitor's Message	Description	Cat.	Reset	Possible defective item
Vehicle emergency	Emergency signal from the server or from the vehicle DPH_NTB_VCL_EMERGENCY_ERROR	OFF	V	System
Vehicle/battery CAN bus off	Bus off error while reading or writing on CanBus DPH_NTB_CAN_BUSOFF_ERROR	N	I	
Vehicle/battery CAN bus warning	Bus warning error while reading or writing on CanBus DPH_NTB_CAN_BUSWARN_ERROR	S	I	System
Vehicle/FastCharge CAN communication	If vehicle or fastcharge enabled, the vehicle or fastcharger must send to the BMI, continuously, within 5 s (while no bus errors), a message. DPH_NTB_CAN_VPA_TIMEOUT_ERROR	S	I	System
Voltage < 2,3V/c for 1h with AC applied or All switches open: BMI is reset and DISCON is kept open	For more then 1 hour the battery voltage was lower then 2,3Volt/cell with AC voltage applied or with all the main switches open; this error opens the disconnection relay to avoid to over discharge the battery with the BMI's electronic. Check if the charger works properly. DPH_NTB_LOW_VOLT_DISCHARGED_ERROR	N	D	System
Write flash constant failed	During an update of the constant in flash memory of BMI (Made by ZEBRA® monitor) an error occurs. DPH_NTB_FLASH_CONST_ERROR	OFF	I	BMI
Wrong temp. gradient while AC heating	AC heater doesn't heat or heats too much: on T1, in 1 hour, delta Temperature < 0℃ or > 30℃. (1 hour with T1>200℃ with Vac>150V & Acheater on with duty cycle > 70%) DPH_NTB_AC_HEATER_HEATUP_ERROR	N	D	Battery BMI
Wrong BMI type for this battery	This error is set if the BMI type is not compatible with the number of cell per chain of the battery. BMI 100V: error if battery with > 40 Cell/chain BMI 160V: error if battery with < 41 Cell/chain or > 65 C/c BMI 300V: error if battery with < 66 Cell/chain or > 117C/c BMI 600V: error if battery with < 118 Cell/chain This error isn't cleared with Zebra Monitor or ignition key, It can be cleared only at start up of the BMI DPH_NTB_BMI_TYPE_FAULT_ERROR	OFF	I	BMI type

PREVIOUS ERRORS LIST APPLY TO BMI's SW V4B0R5 3.02.2010

ERROR CATEGORIES

The errors pertain to different categories depending on the action of the BMI.
In case of errors, the battery system gives a warning to the vehicle and the BMI could provide a warning function or a switch off function with a delay time that is dependent on the error categories:

category	description	action	remark
0	STATISTIC	no reaction	These errors are for information purpose only
1	NOTICE	the display will show the message **System Warning**	no reaction
2	DELAYED_SWITCH_ OFF	the BMI will switch open the main contactors after a delay of five minutes (if the first D-SW-OFF error is an external iso error the delay is 9 minutes)	the display will show the message **System Warning SW OFF**
3	SWITCH_OFF	the BMI will immediately switch open the main contactors	the display will show the message **System Warning SW OFF**

Table 1: Error's categories

ERROR RESET CONDITIONS

IMMEDIATE : the fault will be automatically reset when the fault condition disappears
VEHICLE: the fault will be reset when an ignition signal is applied to the BMI (ignition is switched off and on again) or when AC is connected to the BMI.
DIAGNOSIS: the fault will be manually reset by ZEBRA monitor by the button  (ZEBRA monitor with customer access level (1) is required)

Note: Before resetting errors read and save the errors stack list, the active errors and
send them to FZ-SONICK.