BSD-L7NHB Series User Manual

400VAC EtherCAT Network

EtherCAT.
Conformance tested

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ELECTRONICS

11.2 Diagnosing and Troubleshooting Abnormalities

Alarm or warning will be generated if a problem occurs during operation. If this happens, check the applicable code and take a proper action. If the problem persists, contact our service center.

11.2.1 Servo Motor

[Cause of abnormalities, inspection procedure, and troubleshooting methods]

Symptoms	Cause	Inspection process	Remedies
The motor does not move.	The P-OT and N-OT inputs are off.	Refer to section 3.6, "Signals."	Turn on the P-OT and N-OT inputs.
	The motor has defects.	Use a resistance tester to measure the resistance to the motor lead terminal (resistance between phases: several ohms).	Replace the motor.
	The locking screws are loose.	Check the locking screws.	Tighten any loose screws.
	The external wiring is incorrect or the cables are disconnected.	Check the wires to the motor and the encoder.	Redo the wiring. Replace the cables.
	The encoder has defects.	Check the output waves.	Replace the encoder. (Contact our service center.)
Motor rotation is unstable.	The connection is bad.	Check the connection of the motor lead terminal.	Fix any bad connections.
	The input voltage is low.	Check the input voltage of the drive.	Change the power source.
	Overloads occur.	Check the condition of the machine.	Remove any foreign substances from the rotating unit and grease or lubricate it.
The motor overheats.	The ambient temperature is too high.	Check the temperature around the motor. 40[℃] or less	Change heat transfer structure. Install a cooling fan.
	The surface of the motor is contaminated.	Check whether there are any foreign substances on the surface of the motor.	Clean the surface of the motor.
	Overloads occur.	Check the load on the drive. Check the acceleration/deceleration time.	Reduce the load. Increase the acceleration/deceleration time. Use a motor with a greater capacity.
	The magnetic power of the magnets is reduced.	Check the counter voltage and voltage waveforms.	Replace the motor.
The device is making a strange sound.	Coupling is bad.	Tighten the coupling screws and measure the concentricity of the connection.	Readjust the coupling.
	The bearings are abnormal.	Check the bearings for vibrations and sounds.	Contact us.
	The parameters are set incorrectly (the inertia, gain, and time constants).	Check the parameters.	Refer to Chapter 9, "Object Dictionary."

11.2.2　Servo Drive

■ Servo Alarm

If the drive detects a problem, it will trigger a servo alarm and transition to the servo off state to stop. In this case, the value of the emergency stop setting (0x2013) is used to stop the drive.

Alarm Code	Causes	Details	What to check
AL-10 IPM fault **AL-14** Over current **AL-16** Current limit exceeded	Motor cable error	Wiring is incorrect and check short	Replace motor cable
	Encoder cable error	Wiring is incorrect and check short	Replace encoder cable
	Parameter cable error	Motor ID [0x2000], encoder type[0x2001], encoder form[0x2002] setting vaule should be same with applied to motor label.	Modifty motor label and parameter concordantly
	Check motor phase resistor	Check if U/V/W phase current ffset(0x2015~0x2017) is 5% or above of the rated current, Replace drive	Replace motor
	Machine part has problem	Determine whether there is a conflict or binding in the equipment.	Check machine part
	Drive error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
	Error by noize	Check method to improve noise of wiring, install.	Please check condition of wiring for FG. Match wire size of FG with wire size of drive main circuit.
AL-11 IPM temperature	surroundings temperature	Check wherther surrounding temperature is over 50 [℃]	Lower surrounding temperature
	Continuous Overload alram	Accumulated operate overload percentage [0x2603] Checking the load percentage is under 100%	Change drive and motor capacitiy, Please tune gain.
	Motor cable open	Check accumulated regenerative overload[0x2606]	Adjust regenerarion resistor setting[0x2009] Use external regenerarion resistor.
	Drive setting direction	Check drive setting status	Refer "2. Wiring and Joint
	Drive error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
AL-15 Current offset	Motor U/V/W phase current offset oversetting	Check whether the U/V/W phase current offset [0x2015~0x2017] are 5% of the rated current or highter.	Rerun adjusting phase current offset
	Drive error		If alarm occurs continually after adjusting offset of phase current, please replace new drive because drive has problem.
AL-21 Continuous overload	In case of sequent operating that exceed rated	Check if load which is accumulating driving load rate[0x2603] is below 100% when it is in constant	Change drive and motor capacitiy, Please tune gain.

Alarm Code	Causes	Details	What to check
	load	speed section and stop	
	Motor brake error	Checking w hether the motor brake is not holding	Provide pow er to motor brake
	Parameter setting error	Motor ID[0x2000], Encoder type[0x2001], Check the label of application motor and Encoder form[0x2002] setting value.	Modify the parameter as same as motor label information.
		Over load detected standard load rate setting [0x200F] Value checking	Set as proper value
	Machine part has problem	there is no problem for running	Check machine part.
	Motor cable error	Wiring is incorrect and check short	Replace motor cable.
	Encoder cable error	Wiring is incorrect and check short	Replace encoer cable.
AL-22 Drive temperature 1	surrounding temerature	Check w herther surrounding temperature is over 50 [℃]	Low er surrounding temperature of drive.
	Drive error	Check if displayed value 1 [0x260B] of drive temperature is much different w ith surrounding temperature when it is normal condition.	Replace the drive
AL-23 Regeneration overload	Capacity excess by high frequency operationg or continue regenerative operating	Checking overload rate accumulated regeneration on 0x2606	Adjust value on 0x2009. Use braking resistor
	Parameter setting error	Check setting value[0x2009] ~ [0x200E]	Set as proper value
	Main pow er input voltage error	Check w hether Main pow er (544[Vac]) has problem or not.	Recheck the pow er supply
	Drive error	Checking the temperature of regenerative resistance on Servo-off status	Replace the drive
AL-24 Motor cable open	Parameter setting error	Check [0x2015], [0x2015], [0x2015] Check value offset current	Process the Phase current offset control procedure command
	Motor cable error	Check w hether cable is disconnected.	Replace the motor cable.
	Motor error	Check short circuit of U,V,W in Motor (U-V, V-W, W-U)	Replace the motor
	Drive error		If specific alarmsignal is persistently occurred, It is highly possible to have fault, so Kindly recommend you to change the servo drive.

Alarm Code	Causes	Details	What to check
AL-25 Drive temperature 2	Surrounding temperature	Check whether surrounding temperature is over 50[℃]	Lower the surronding termpertaure of drive
	Drive error	Comparing displayed drive temperature 2 [0x260C] in normal status and the surrounding temperature.	Replace the drive
AL-26 Encoder temperature	Reserved		
AL-30 Encoder communication **AL-31** Encoder cable open **AL-32** Encoder data	Encoder cable error	Disconnect, wiring is incorrect and check Short.	Replace encoder cable.
	Parameter setting error	Value of [0x2001], [0x2002] is same with application motor label.	Modify the parameter as same as motor label information. If modified value is not applied to parameter, it is highly possible to have fault, So Kindly recommend you to change the servo motor.
	Encoder error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
	Drive error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
AL-33 Motor setting	Setting Motor ID	Value of [0x2000] is same with application motor label.	Revise it with motor label information equally. It is possible to release alarm when power off/on after adjusting parameter.
	Drive error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
AL-34 Z Phase open	Encoder cable error	Wiring is incorrect and check Short.	Replace encoder cable.
	Encoder error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
	Drive error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
AL-35 Low battery	Parameter setting error	Check setting value [0x2005]	It will be no alarm to set as 1 when you use absolute encoder as the incremental encoder.
	Bad connection of battery No connected.	Check status of battery access	Connect battery rightly.
	When battery voltage is low	Check whether voltage is over 3.3v.	Replace bettery
AL-36 Sinusoidal ENC	Encoder cable error	Wiring is incorrect and check short Check shield and FG disconnect	Replace encoder cable.

Alarm Code	Causes	Details	What to check
amplitude **AL-37** Sinusoidal ENC frequncy	Parameter setting error	Check setting valud of encoder type [0x2001]	Check setting encoder type. Check speed command.(Maximum:250kHz)
	Drive error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
	resolver error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
	Encoder error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
AL-38 Encoder setting error	Drive / Motor combination error	Check brand label code of motor and drive.	Use motor and drive of same brand label.
	Encoder cable error	Wiring is incorrect and check Short	Replace encoder cable.
	Encoder error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
	Drive error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
AL-40 Under voltage	Main power input voltage error	Check the main power voltage is over 3phase 219[Vac]	Recheck the power supply.
		Check [0x2605] value is over 310 [Vdc] when main power is accordingly input	Replace the drive.
	running when power voltage is low	Check wiring of main power supply	Use 3 phase as supply voltage.
AL-41 Over voltage	Main power input voltage error	Check whether the main power voltage is below 572[Vac]	Recheck the power supply.
		Check [0x2605] value is below 810[Vdc] when main power is accordingly input.	Replace the drive.
	When braking resistor is high	Check operating condition regenerative resistance.	Review the regenerative resistance consider the operating condition and load.
	Setting value of	In case of many time for acceleration / deceleration	Set longer acceleration / deceleration time

Alarm Code	Causes	Details	What to check
	acceleration/ deceleration		
	Drive error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
AL.42 Main power fail	Main power input voltage error	check voltage between phase 380-480[Vac] of L1, L2, L3.	Recheck power supply.
	Parameter setting error	Check setting value arroding to state of main power [0x2006]	Wire or set parameter as input power on (possible 3 phase)
	momentary power failure	Check setting value [0x2007]	check main power source or reduce value of [0x2007]
	Drive error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
AL.43 Control power fail	Voltage between phase of C1, C2 error	Voltage between phase of C1, C2 is within 380-480[Vac].	Recheck power supply of drive
	Drive error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
AL.50 Over speed limit	Motor Encoder error	Wiring is incorrect and check Short.	Replace motor cable.
	Encoder cable error	Wiring is incorrect and check Short.	Replace encoder cable.
	Parameter setting error	Value of [0x2000], [0x2001], [0x2002] is same with application motor label.	Modify the parameter as sams as motor label information.
		Check setting value [0x6091]	Set Electronic gear ratio low.
		Check setting value[0x2100] ~ [0x211F]	Readjust gain according to operating condtion.
	Encoder error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
	Drive error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
AL.51 POS following	Parameter setting error	Check setting value [0x3000], [0x3003], [0x3004].	Set up correct parameter according to operating method.
		Check [0x6091] Setting value	Set Electronic gear ratio low.
		Check setting value on 0x6066 of position error excess time, 0x6065 of position error range	Set up correct parameter according to operating method.
	Machine part has problem	Checking it was forced by drive part	Check Machine part has problem
	Drive error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
AL.53 Excessive SPD deviation	Motor cable error	Disconnect, wiring is incorrect and check Short.	Replace motor cable
	Encoder cable error	Disconnect, wiring is incorrect and check Short.	Replace encoder cable

Alarm Code	Causes	Details	What to check
	Parameter setting	Value of [0x2000], [0x2001], [0x2002] is same with application motor label.	Modify the parameter as sams as motor label information.
		Check setting value [0x6091]	Set Electronic gear ratio low..
	Machine part has problem	Checking it was forced by drive part operating condition of limit contact point sensor	Check Machine part.
	Encoder error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
	Drive error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
AL.63 Parameter checksum	When O/S is changed	Check parameter that parameter setting value was set as maximum value of variable form	Restore initial parameter (0x1011). If you restore it, setting up parameter would be changed into initial value. So set up parameter before operating
	Drive error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
AL.71 Factory setting	Parameter setting error	Contact our service center Check [0x1008] DeviceName	Please download OS or set capacity of drive again. If alarm continue after servo on again, Replace drive. Because drive may have problem.

■ Servo Warning

If the drive detects an error classified as a servo warning, it will trigger a warning. In this case, the drive will maintain normal operation condition. After the cause of the warning is eliminated, the warning will be automatically cleared. In case of a warning, take an appropriate action. You can specify if each warning is checked with warning mask configuration (0x2014).

Bit	Warning code	Warning name
0	W01	Main power phase loss
1	W02	Low voltage of encoder battery
2	W04	Software Position Limit
3	-	-
4	W10	Operation overload
5	W20	Abnormal combination of Drive and Motor, abnormal I/O setting
6	W40	Low voltage
7	W80	Emergency signal input

Alarm Code	Causes	Detail	What to check
B B H O 1 PWR_FAIL	Main power input voltage error	Check voltage between phase 380-480[Vac] of L1, L2, L3	Recheck power supply.
	Parameter setting error	Check value of main power input mode set[0x2006] arroding to state of main power input.	Wire or set parameter as input power on(possible 3 phase)
	Momentary power failure	Check value of main power input mode set[0x2006] arroding to state of main power input.	Check actual main power or increase value of checking time of loss of main power.
	Drive error		If alarm continue after servo on again, Replace drive. Because drive may have problem.
B B H O 2 LOW_BATT	Parameter setting error	Check setting value of absolute encoder [0x2005]	Alarm will be disappeared if you set "1" when using ABS encoder as incremental encoder.
	Bad conection of battery, No connected.	Check the status of battery	Connect battery rightly.
	When battery voltage is low.	Check whether battery voltage is over 3.3V	Replace battery.
B B H O 4 SW_POS_LMT	Parameter setting error	Setting function of software restriction on location [0x2400], Check value of software restriction on location[0x607D]	Change value of software position limit function[0x2400] or change the set of limit value of maximum postion and minimum position of software position limit[0x607D]
B B H 1 0 OV_LOAD	In case of sequent	Check overload warning level setting[0x2010] and constant speed section or accumulated operation	Change drive and motor capacitiy, Please tune gain.

Alarm Code	Causes	Detail	What to check
	operating that exceed rated load	overload rate[0x2603]	Adjust the setting value overload warning level[0x2010].
	Motor brake error	Checking the motor brake is not holding	Provide supply power to motor brake.
	Parameter setting error	Motor ID[0x2000], Encoder type[0x2001], Encoder form[0x2002] vaule is same with motor label.	Modify the parameter as sams as motor label information.
		Check value of set of overload detecting basic load rate[0x200F]	Set as proper value.
	Machine part has problem	There is no problem for running	Check machine part has problem
	Motor cable error	Wiring is incorrect and check Short.	Replace motor cable
	Emcoder cable error	Wiring is incorrect and check Short.	Replace encoder cable
820 SETUP	Drive / Motor Combination error	Check whether capacity of current of motor is bigger than capacity of current of drive or not.	reduce value of torque limit or use the motor which capacity is lower than capacity of current of drive
	IO setting error	Check whether one signal is assigned more than 2 in digital input signal assignment[0x2200] ~ [0x2208] and digital output signal assignment[0x2210]~[0x2213].	Set up correct parameter according to operating method.
840 UD_VTG	Main power input voltage error	Check if main power has problem or not	Recheck the power supply.
		Check that DC link voltage [0X2605] is between 190~405 [Vdc] when main power is supplied correctly.	Replace the drive
	Running when power voltage is low	Check wiring status of main power	Use 3 phase as supply voltage
880 EMG	EMG contact error	It is state of EMG Wiring or drive parameter(drivecontrol input1[0x211F], digital input signal1 set[0x2200]~digital input Check sinal 16 setting[0x220F]	Set up correct parameter according to operating method.
	Drive error		If alarm continue after servo on again, Replace drive. Because drive may have problem.