Maintenance and Troubleshooting

Table of Contents

Maintenance and Inspections

Modern AC drives are based on solid state electronics technology, including ICs, resistors, capacitors, transistors, cooling fans, relays, etc. These components have a limited life under normal operation. Preventive maintenance is required to operate the GS4 drive in its optimal condition, and to ensure a long life. We recommend that a qualified technician perform a regular inspection of the GS4 drive. Some items should be checked once a month, and some items should be checked yearly.

NOTE: All inspections should be accomplished with Safety in mind with due and required caution. Some of these Inspection items may require the Drive to be powered down, while others may require power to be applied. Proper safety precautions including the use of PPE are/may be required. Please review cautionary statements in each section

Monthly Inspection

Check the following items at least once a month.

1) *Make sure the motors are operating as expected.*
2) *Make sure the drive installation environment is normal.*
3) *Make sure the enclosure and drive cooling systems are operating as expected.*
4) *Check for irregular vibrations or sounds during operation.*
5) *Make sure the motors are not overheating during operation.*
6) *Check the input voltage to the* GS4 *drive and make sure the voltage is within the operating range. Check the voltage with a voltmeter.*

Annual Inspection

Check the following items once annually.

1) *Check the torque of the GS4 power and control terminal screws and tighten if necessary. They may loosen due to vibration or changing temperatures.*
2) *Make sure the conductors and insulators are not corroded or damaged.*
3) *Check the resistance of cable insulation with a megohmmeter.*
4) *Clean off any dust and dirt with a vacuum cleaner. Pay special attention to cleaning the ventilation ports and PCBs. Always keep these areas clean. Accumulation of dust and dirt in these areas can cause unforeseen failures.*
5) *Recharge the capacitors of any drive that is in storage or is otherwise unused.*

Recharge Capacitors (for drives not in service)

Recharge the DC link before using any drive that has not been operated within a year:

1) *Disconnect the motor from the drive.*
2) *Apply input power to the drive for 2 hours.*

If the drive is stored or is otherwise unused for more than a year, the drive's internal DC link capacitors should be recharged before use. Otherwise, the capacitors may be damaged when the drive starts to operate. We recommend recharging the capacitors of any unused drive at least once per year.

Disconnect AC power and ensure that the internal capacitors have fully discharged before inspecting the GS4 drive! Wait at least two minutes after all display lamps have turned off.

CAUTION

- ☑ Wait 5 seconds after a fault has been cleared before performing reset via keypad or input terminal.
- ☑ When the power is off after 5 minutes for ≤ 30hp models and 10 minutes for ≥ 40hp models, please confirm that the capacitors have fully discharged by measuring the voltage between + and -. The voltage between + and - should be less than 25VDC.
- ☑ Only qualified personnel can install, wire and maintain drives. Please take off any metal objects, such as watches and rings, before operation. And only insulated tools are allowed.
- ☑ Never reassemble internal components or wiring.
- ☑ Make sure that installation environment complies with regulations without abnormal noise, vibration and smell.

Recommended Inspection Schedules

Before the check-up, always turn off the AC input power and remove the cover. Wait at least 10 minutes after all display lamps have gone out, and then confirm that the capacitors have fully discharged by measuring the voltage between DC+ and DC-. The voltage between DC+ and DC-should be less than 25VDC.

Ambient environment

Check Items	Methods and Criteria	Maintenance Period		
		Daily	Half Year	One Year
Check the ambient temperature, humidity, vibration and see if there are any dust, gas, oil or water drops	Visual inspection and measurement with equipment with standard specification	◯		
If there are any dangerous objects	Visual inspection	◯		

Voltage

Check Items	Methods and Criteria	Maintenance Period		
		Daily	Half Year	One Year
Check if the voltage of main circuit and control circuit is correct	Measure with multimeter with standard specification	◯		

Digital Keypad Display

Check Items	Methods and Criteria	Maintenance Period		
		Daily	Half Year	One Year
Is the display clear for reading	Visual inspection	◯		
Any missing characters	Visual inspection	◯		

Mechanical parts

Check Items	Methods and Criteria	Maintenance Period		
		Daily	Half Year	One Year
If there is any abnormal sound or vibration	Visual and audible inspection		◯	
If there are any loose screws	Tighten the screws		◯	
If any part is deformed or damaged	Visual inspection		◯	
If there is any color change due to overheating	Visual inspection		◯	
If there is any dust or dirt	Visual inspection		◯	

Recommended Inspection Schedules (continued)

Main circuit

Check Items	Methods and Criteria	Maintenance Period		
		Daily	Half Year	One Year
If there are any loose or missing screws	Tighten or replace the screw	◯		
If any drive or wiring insulation is deformed, cracked, damaged or has changed color due to overheating or aging	Visual inspection **NOTE: Ignore any color change of copper plate**		◯	
If there is any dust or dirt	Visual inspection		◯	

Terminals and wiring of main circuit

Check Items	Methods and Criteria	Maintenance Period		
		Daily	Half Year	One Year
If the terminal color or the placement has changed due to overheating	Visual inspection		◯	
If the wiring insulation is damaged or there has been a color change	Visual inspection		◯	
If there is any damage	Visual inspection	◯		

DC capacity of main circuit

Check Items	Methods and Criteria	Maintenance Period		
		Daily	Half Year	One Year
If there is any liquid leaking, color change, crack or deformation	Visual inspection	◯		
If the capacitor safety vent is bulging or inflated.	Visual inspection	◯		
Measure static capacity when required (if drive overloads/faults during normal operation)	Measure with multimeter with standard specification	◯		

Recommended Inspection Schedules (continued)

Resistor of main circuit

Check Items	Methods and Criteria	Maintenance Period		
		Daily	Half Year	One Year
If there is any peculiar smell or insulation cracks due to overheating	Visual inspection, smell	○		
If there is any disconnection or discoloration	Visual inspection	○		
If the connection is damaged	Measure with a multimeter with standard specifications	○		

Transformer and reactor of main circuit

Check Items	Methods and Criteria	Maintenance Period		
		Daily	Half Year	One Year
If there is any abnormal vibration or peculiar smell	Visual, audible inspection and smell	○		

Magnetic contactor and relay of main circuit

Check Items	Methods and Criteria	Maintenance Period		
		Daily	Half Year	One Year
If there are any loose screws	Visual and audible inspection	○		
If the contact works correctly	Visual inspection	○		

Printed circuit board and connector of main circuit

Check Items	Methods and Criteria	Maintenance Period		
		Daily	Half Year	One Year
If there are any loose screws and connectors	Tighten the screws and press the connectors firmly in place		○	
If there is any peculiar smell and/or color change	Visual and smell inspection		○	
If there is any crack, damage, deformation or corrosion	Visual inspection		○	
If there is any liquid leakage or deformation in capacity	Visual inspection		○	

Recommended Inspection Schedules (continued)

Cooling fan of cooling system

Check Items	Methods and Criteria	Maintenance Period		
		Daily	Half Year	One Year
If there is any abnormal sound or vibration	Visual, audible inspection and turn the fan with hand (turn off the power before operation) to see if it rotates smoothly		◯	
If there is any loose screw	Tighten the screw		◯	
If there is any color change due to overheating	Change the fan		◯	

Ventilation channel of cooling system

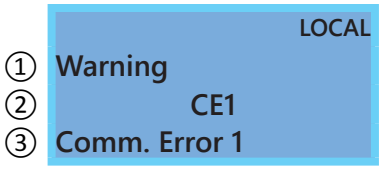
Check Items	Methods and Criteria	Maintenance Period		
		Daily	Half Year	One Year
If there is any obstruction in the heat sink, air intake or air outlet	Visual inspection		◯	

Please use a clean lint free cloth for cleaning and use a dust cleaner to remove dust when necessary.

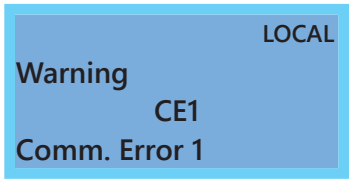
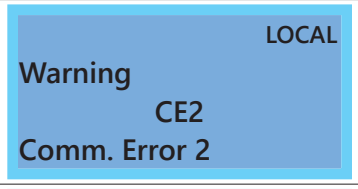
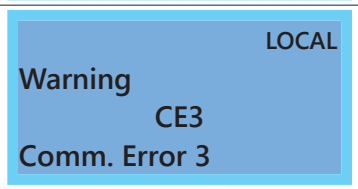
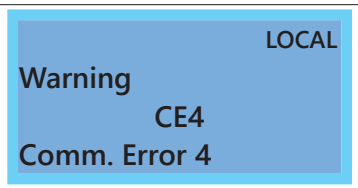
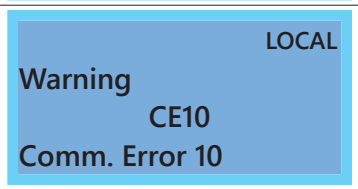
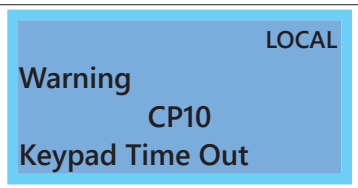
TROUBLESHOOTING

WARNING CODES

The GS4 drive has a comprehensive diagnostic system that includes several different warning codes. The most common warning codes can be read on the digital keypad display.



① Display error signal type
② Abbreviated error code
The code is displayed as shown on GS4-KPD
③ Display error description

Warning Codes		
Display on GS4-KPD Keypad	***Warning Code in 2108h Active Warning***	***Descriptions***
n/a	0	No error
	1	Modbus function code error This error is generated if any command code other than 0x03, 0x06, 0x08 or 0x10 is seen.
	2	Address of Modbus data error
	3	Modbus data error
	4	Modbus communication error
	5	Modbus transmission time-out
	6	Keypad transmission time-out

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Warning Codes (continued)		
Display on GS4-KPD Keypad	***Warning Code in 2108h Active Warning***	***Descriptions***
LOCAL Warning SE1 Save Error 1	7	**Keypad COPY error 1** Keypad transfer (check) error, including communication delays, communication error (keypad received error FF86) and parameter value error. P9.06 must be set to 1 for a keypad to drive copy.
LOCAL Warning SE2 Save Error 2	8	**Keypad COPY error 2** Keypad transfer (check) done, parameter write error
LOCAL Warning oH1 Over heat 1 warn	9	IGBT over-heating warning
LOCAL Warning oH2 Over heat 2 warn	10	Capacitor over-heating warning
LOCAL Warning PID PID FBK Error	11	PID feedback error
LOCAL Warning ANL Analog Loss	12	AIx 4~20mA Signal Loss AI1 or AI2 signal drops below 4mA when P4.05 or P4.06 are set to 1 (4~20mA). Enabled with P4.63 and P4.64 (AIx 4~20mA Loss Detection).
LOCAL Warning uC Under Current	13	Low current
LOCAL Warning AUE Auto-tune Error	14	Auto tuning error
n/a	15~18	reserved
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Warning Codes (continued)		
Display on GS4-KPD Keypad	***Warning Code in 2108h Active Warning***	***Descriptions***
LOCAL Warning PHL Phase Loss Warn	19	Input phase Loss
LOCAL Warning ot1 Over Torque 1	20	Over torque 1
LOCAL Warning ot2 Over Torque 2	21	Over torque 2
LOCAL Warning oH3 Motor Over Heat	22	Motor over-heating
LOCAL Warning c.c. cc Warn	23	Current clamp warning
LOCAL Warning oSL Over Slip Warn	24	Over Slip
LOCAL Warning tUn Auto tuning	25	Auto tuning processing
n/a	26~27	reserved
LOCAL Warning OPHL Output PHL Warn	28	Output phase loss
n/a	29	reserved
(continued next page)		

Warning Codes (continued)		
Display on GS4-KPD Keypad	***Warning Code in 2108h Active Warning***	***Descriptions***
LOCAL Warning SE3 CopyEn/Model Err	30	**Keypad COPY error 3** P9.06 is not set to 1 before the copy function is started. If COPYing from Keypad to VFD (AC drive), make sure P9.06 Parameter Copy is set to 1 before copying.
n/a	31~46	reserved
LOCAL Warning PLrA RTC Adjust	47	The Real Time Clock has been adjusted.
n/a	48	reserved
LOCAL Warning PLrt Keypad RTC TOut	49	Keypad Real Time Clock timout Turn power on and off after making sure that the keypad is securely connected.
LOCAL Warning PLod PLC Out of Range	50	Drive PLC requesting register address or block of addresses that is out of range or does not exist.
LOCAL Warning PLSv Save mem defect	51	Save error of PLC download
LOCAL Warning PLdA Data defect	52	Data error during PLC operation
LOCAL Warning PLFn Function defect	53	Function code of PLC download error (occurs on PLC register overflow. Also occurs if the PLC is set to RUN, and there is no program installed)
LOCAL Warning PLor Buf overflow	54	PLC register overflow

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Warning Codes (continued)		
Display on GS4-KPD Keypad	***Warning Code in 2108h Active Warning***	***Descriptions***
LOCAL Warning PLFF Function defect	55	Function code of PLC operation error
LOCAL Warning PLSn Check sum error	56	PLC checksum error
LOCAL Warning PLEd No end command	57	PLC end command is missing
n/a	58	reserved
LOCAL Warning PLdF Download fail	59	PLC download fail
LOCAL Warning PLSF Scan time fail	60	PLC scan time exceed
n/a	61~69	reserved
LOCAL Warning ECid ExCom ID failed	70	Duplicate MAC ID error Node address setting error
LOCAL Warning ECLv ExCom pwr loss	71	Low voltage of communication card
LOCAL Warning ECtt ExCom Test Mode	72	Communication card in test mode

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Warning Codes (continued)		
Display on GS4-KPD Keypad	***Warning Code in 2108h Active Warning***	***Descriptions***
LOCAL Warning ECbF ExCom Bus off	73	ExCom Bus off
LOCAL Warning ECnP ExCom No power	74	ExCom No power
LOCAL Warning ECFF ExCom Facty def	75	Factory default setting error
LOCAL Warning ECif ExCom Inner err	76	Serious internal error
LOCAL Warning ECio ExCom IONet brk	77	IO connection break
LOCAL Warning ECPP ExCom Pr data	78	ExCom Pr data
LOCAL Warning ECPi ExCom Conf data	79	ExCom Conf data
LOCAL Warning ECEF ExCom Link fail	80	Ethernet Link fail. If a communications card is installed but not connected to an active network, this warning will appear. Please connect to valid network link. Reset card to default and/or re-flash comm card firmware if problem persists.

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Warning Codes (continued)		
Display on GS4-KPD Keypad	***Warning Code in 2108h Active Warning***	***Descriptions***
LOCAL Warning ECto ExCom Inr T-out	81	Communication time-out for communication card and drive
LOCAL Warning ECCS ExCom Inr CRC	82	Check sum error for communication card and drive
LOCAL Warning ECrF ExCom Rtn def	83	Communication card returns to default setting
LOCAL Warning ECo0 ExCom MTCP over	84	Modbus TCP exceeded maximum communication value
LOCAL Warning ECo1 ExCom EIP over	85	EtherNet/IP exceeded maximum communication value
LOCAL Warning ECiP ExCom IP fail	86	IP fail
n/a	87	reserved
LOCAL Warning ECbY ExCom Busy	88	Communication card busy
LOCAL Warning ECCb ExCom Card brk	89	Loss of communication between Communication Card and GS4 drive. To recover: Power down the drive and remove all communication cables. Remove and re-seat the comm card. Do not reconnect any comm cables. Power up the drive. If the ECCb fault still exists, replace the comm card.

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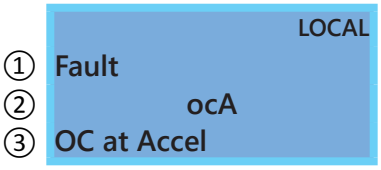
Warning Codes (continued)		
Display on GS4-KPD Keypad	***Warning Code in 2108h Active Warning***	***Descriptions***
LOCAL Warning WdCPLP Copy PLC Pass	90	Copy PLC password error
LOCAL Warning RdCPL0 Copy PLC Mode	91	Copy PLC read mode error
LOCAL Warning WtCPL1 Copy PLC Mode	92	Copy PLC write mode error
LOCAL Warning CPLv Copy PLC Version	93	Copy PLC version error
LOCAL Warning CPLS Copy PLC Size	94	Copy PLC capacity size error
LOCAL Warning CPLF Copy PLC Func	95	Copy PLC: Disable PLC functions to copy *Warning Code 95 could also show up as ERR7 if the PLC is in STOP mode. Disable the PLC before copying.*
LOCAL Warning CPLt Copy PLC TimeOut	96	Copy PLC time-out Resettable only by cycling power to the drive
LOCAL Warning CD10 Card TimeOut	97	Ethernet communication has not been received from the external controller (within the Ethernet Timeout window).

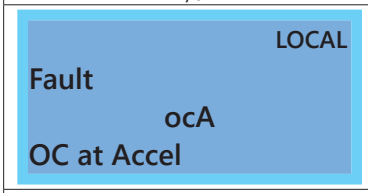
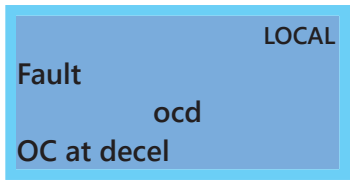
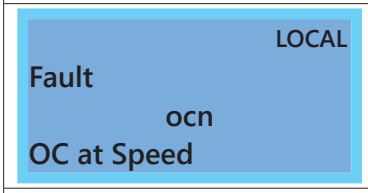
FAULT CODES

The GS4 drive has a comprehensive fault diagnostic system that include a variety of fault messages. When a fault is detected, the GS4 drive will shut down in order to protect internal components. The following faults are displayed as shown on the GS4 digital keypad display.



① Display error signal type
② Abbreviate error code
The code is displayed as shown on GS4-KPD
③ Display error description

Gaps in the fault ID numbers below are set aside as "reserved" faults for possible future use. Should your GS4 drive repeatedly display a reserved fault, please note the fault ID number and contact AutomationDirect technical support.

Fault Codes				
Display on GS4-KPD Kepad	***Fault Code in Status Monitor 1***	***Fault Description***	***Corrective Action***	***Can be Bypassed in Fire Mode (Yes / no)***
n/a	0	no error	none needed	n/a
	1	Over-current during acceleration (Output current exceeds triple rated current during acceleration.)	1) Short circuit at motor output: Check for possible poor insulation at the output. 2) Acceleration Time too short: Increase the Acceleration Time. 3) GS4 drive output power is too small: Replace the GS4 drive with the next higher power model.	Yes
	2	Over-current during deceleration (Output current exceeds triple rated current during deceleration.)	1) Short circuit at motor output: Check for possible poor insulation at the output. 2) Deceleration Time too short: Increase the Deceleration Time. 3) GS4 drive output power is too small: Replace the GS4 drive with the next higher power model.	Yes
	3	Over-current during steady state operation (Output current exceeds triple rated current during constant speed.)	1) Short circuit at motor output: Check for possible poor insulation at the output. 2) Sudden increase in motor loading: Check for possible motor stall. 3) GS4 drive output power is too small: Replace the GS4 drive with the next higher power model.	Yes
	4	Ground fault	When (one of) the output terminal(s) is grounded, short-circuit current is more than 50% of the GS4 drive rated current, the GS4 drive power module may be damaged. NOTE: The short-circuit protection is provided for AC motor drive protection; not for protecting the user. 1) Check the wiring connections between the GS4 drive and motor for possible short circuits, also to ground. 2) Check whether the IGBT power module is damaged. 3) Check for possible poor insulation at the output.	Yes

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Fault Name	*Fault Code in Status Monitor 1*	*Fault Descriptions*	*Corrective Actions*	*Can be Bypassed in Fire Mode (Yes / no)*
LOCAL Fault occ IGBT Short Ckt	5	Short-circuit is detected between upper bridge and lower bridge of the IGBT module	Replace the drive. If still under warranty, please contact AutomationDirect Returns Department.	Yes
LOCAL Fault ocS OC at Stop	6	Hardware failure in current detection	Replace the drive. If still under warranty, please contact AutomationDirect Returns Department.	Yes
LOCAL Fault ovA OV at Accel	7	DC BUS over-voltage during acceleration (230V: DC 450V; 460V: DC 900V)	1) Check if the input voltage falls within the rated GS4 drive input voltage range. 2) Check for possible voltage transients. 3) May be the result of starting the drive into a spinning load such as a fan, pump or overhauling load. Avoid starting the drive with the motor spinning. DC braking using parameters P1.25 (DC Injection Current Level) and P1.26 (DC Injection Time During Start-up), can help to stop the spinning motor before the drive begins to ramp up the output frequency, thereby eliminating the source of regeneration.	Yes
LOCAL Fault ovd OV at Decel	8	DC BUS over-voltage during deceleration (230V: DC 450V; 460V: DC 900V)	1) Check if the input voltage falls within the rated GS4 drive input voltage range. 2) Check for possible voltage transients. 3) If DC BUS over-voltage due to regenerative voltage, please increase the Deceleration Time or add an optional brake resistor.	Yes
LOCAL Fault ovn OV at Speed	9	DC BUS over-voltage at constant speed (230V: DC 450V; 460V: DC 900V)	1) Check if the input voltage falls within the rated GS4 drive input voltage range. 2) Check for possible voltage transients.	Yes
LOCAL Fault ovS OV at Stop	10	Hardware failure in voltage detection.	1) Check if the input voltage falls within the rated GS4 drive input voltage range. 2) Check for possible voltage transients.	Yes
LOCAL Fault LvA LV at Accel	11	DC BUS voltage is less than P6.35 during acceleration	1) Check if the input voltage is normal. 2) Check for possible sudden load.	no
LOCAL Fault Lvd LV at Decel	12	DC BUS voltage is less than P6.35 during deceleration	1) Check if the input voltage is normal. 2) Check for possible sudden load.	no

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Fault Name	*Fault Code in Status Monitor 1*	*Fault Descriptions*	*Corrective Actions*	*Can be Bypassed in Fire Mode (Yes / no)*
LOCAL Fault Lvn LV at Speed	13	DC BUS voltage is less than P6.35 in constant speed	1) Check if the input voltage is normal. 2) Check for possible sudden load.	no
LOCAL Fault LvS LV at Stop	14	DC BUS voltage is less than P6.35 at stop	1) Check if the input voltage is normal 2) Check for possible sudden load	no
LOCAL Fault OrP Input Phase loss	15	Output Ripple / Phase Loss	Check Power Source Input if all 3 input phases are connected without loose contacts. For models 40hp and above, please check if the fuse for the AC input circuit is blown.	Yes
LOCAL Fault oH1 IGBT Over Heat	16	IGBT overheating IGBT temperature exceeds protection level	1) Ensure that the ambient temperature falls within the specified temperature range. 2) Make sure that the ventilation holes are not obstructed. 3) Remove any foreign objects from the heatsinks and check for possible dirty heat sink fins. 4) Check the fan and clean it. 5) Provide enough spacing for adequate ventilation.	Yes
LOCAL Fault oH2 Cap Over Heat	17	Heatsink overheating Capacitance temperature exceeds cause heatsink overheating.	1) Ensure that the ambient temperature falls within the specified temperature range. 2) Make sure heat sink is not obstructed. Check if the fan is operating 3) Check if there is enough ventilation clearance for the GS4 drive.	Yes
LOCAL Fault tH1o Thermister1 Open	18	IGBT Hardware Error	Internal drive error. Replace the drive. If still under warranty, please contact AutomationDirect Returns Department.	Yes
LOCAL Fault tH2o Thermister2 Open	19	Capacitor Hardware Error	Internal drive error. Replace the drive. If still under warranty, please contact AutomationDirect Returns Department.	Yes
LOCAL Fault PWR Power Reset Off	20	Power Loss (Power Down)	Check for loose input power connections. Restore line power.	no

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Fault Name	*Fault Code in Status Monitor 1*	*Fault Descriptions*	*Corrective Actions*	*Can be Bypassed in Fire Mode (Yes / no)*
LOCAL Fault oL Overload	21	Overload The GS4 drive detects excessive drive output current.	1) Check if the motor is overloaded. 2) Use the next higher HP drive model.	no
LOCAL Fault EoL1 Mtr1 Thermal OL	22	Electronic thermal relay 1 protection	1) Check the setting of electronics thermal relay (P6.01) 2) Use the next higher HP drive model.	no
LOCAL Fault EoL2 Mtr2 Thermal OL	23	Electronic thermal relay 2 protection	1) Check the setting of electronics thermal relay (P6.03) 2) Use the next higher HP drive model.	no
LOCAL Fault oH3 Mtr Overheat-PTC	24	Motor overheating The GS4 drive detecting internal temperature exceeds the setting of P6.40 (PTC level)	1) Make sure that the motor is not obstructed. 2) Ensure that the ambient temperature falls within the specified temperature range. 3) Use the next higher HP drive model.	Yes
n/a	25	reserved	n/a	n/a
LOCAL Fault ot1 Over Torque 1	26	These two fault codes will be displayed when output current exceeds the over-torque detection level (P6.15 or P6.18) and exceeds over-torque detection (P6.16 or P6.19) and it is set to 2 or 4 in P6.14 or P6.17.	1) Check whether the motor is overloaded. 2) Check whether motor rated current setting (P0.01) is suitable 3) Use the next higher HP drive model.	no
LOCAL Fault ot2 Over Torque 2	27			no
LOCAL Fault uC Under Current	28	Low current detection (uC does *not* cause drive to stop if in Fire Mode)	Check P6.52, P6.53, P6.54.	no
n/a	29	reserved	n/a	n/a
LOCAL Fault cF1 EEPROM Write Err	30	Internal EEPROM can not be programmed.	1) Reset to factory settings. 2) Replace the drive. If still under warranty, please contact AutomationDirect Returns Department.	no

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Fault Name	*Fault Code in Status Monitor 1*	*Fault Descriptions*	*Corrective Actions*	*Can be Bypassed in Fire Mode (Yes / no)*
LOCAL Fault cF2 EEPROM Read Err	31	Internal EEPROM can not be read.	1) Reset to factory settings. 2) Replace the drive. If still under warranty, please contact AutomationDirect Returns Department.	no
n/a	32	reserved	n/a	n/a
LOCAL Fault cd1 Amp Err: U Phase	33	U-phase error	Power cycle the drive allowing the capacitor bank to discharge. Should this fault be consistently displayed, the drive is most likely damaged and needs repair or replacement.	no
LOCAL Fault cd2 Amp Err: V Phase	34	V-phase error	Power cycle the drive allowing the capacitor bank to discharge. Should this fault be consistently displayed, the drive is most likely damaged and needs repair or replacement.	no
LOCAL Fault cd3 Amp Err: W Phase	35	W-phase error	Power cycle the drive allowing the capacitor bank to discharge. Should this fault be consistently displayed, the drive is most likely damaged and needs repair or replacement.	no
LOCAL Fault Hd0 CC HW Error	36	CC (current clamp)	Power cycle the drive allowing the capacitor bank to discharge. Should this fault be consistently displayed, the drive is most likely damaged and needs repair or replacement.	no
LOCAL Fault Hd1 OC HW Error	37	OC hardware error	Power cycle the drive allowing the capacitor bank to discharge. Should this fault be consistently displayed, the drive is most likely damaged and needs repair or replacement.	no
LOCAL Fault Hd2 OV HW Error	38	OV hardware error	Power cycle the drive allowing the capacitor bank to discharge. Should this fault be consistently displayed, the drive is most likely damaged and needs repair or replacement.	no
LOCAL Fault Hd3 OCC HW Error	39	OCC hardware error	Power cycle the drive allowing the capacitor bank to discharge. Should this fault be consistently displayed, the drive is most likely damaged and needs repair or replacement.	no

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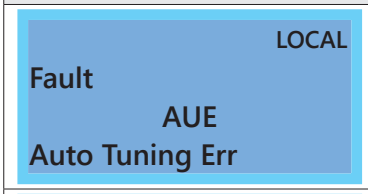
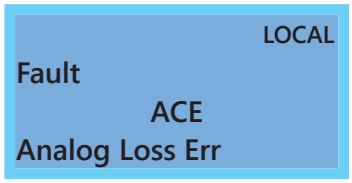
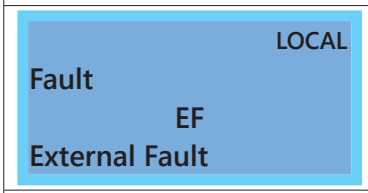
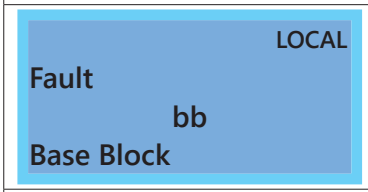
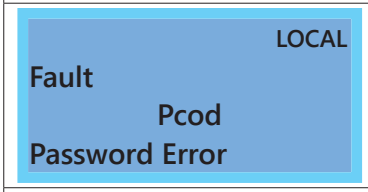
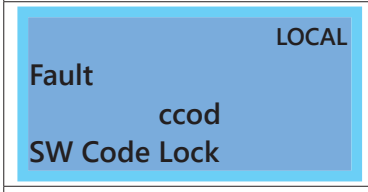
Fault Name	*Fault Code in Status Monitor 1*	*Fault Descriptions*	*Corrective Actions*	*Can be Bypassed in Fire Mode (Yes / no)*
	40	Auto tuning error	1) Check cabling between drive and motor 2) Try again.	no
	41	PID loss (ACI)	1) Check the wiring of the PID feedback. 2) Check the PID parameters settings.	no
n/a	42~47	reserved	n/a	n/a
	48	Analog Signal Loss Error (4~20mA)	1) Check the 4~20mA signal wiring (AI1 or AI2). 2) Check if the analog signal is less than 4mA. *NOTE*: P4.63 or P4.64 must be set to 3 to enable the Analog Loss Fault. This fault can be temporarily bypassed by switching Local/Remote Mode. (The Fault is active only if the drive is actively looking for the analog signal).	no
	49	External Fault	1) Input EF (N.O.) on external terminal is closed to GND. Output U, V, W will be turned off. 2) Press Reset after fault has been cleared.	no
	50	Emergency stop	1) When the multi-function input terminals DI1 to DI6 are set to emergency stop, the GS4 drive stops output U, V, W and the motor coasts to stop. 2 Press RESET after fault has been cleared.	no
	51	External Base Block	1) When the external input terminal (B.B) is active, the GS4 drive output will be turned off. 2) Deactivate the external input terminal (B.B) to operate the GS4 drive again.	no
	52	Password is locked	Keypad will be locked. Power cycle the drive then re-enter the correct password. See P8.06 and P8.07.	no
	53	Software version error	The firmware version is corrupt. Please re-download the firmware.	no

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Fault Name	*Fault Code in Status Monitor 1*	*Fault Descriptions*	*Corrective Actions*	*Can be Bypassed in Fire Mode (Yes / no)*
LOCAL Fault CE1 PC Cmd Error	54	Illegal function code	Check if the function code is correct (function code must be 03, 06, 10, 63).	no
LOCAL Fault CE2 PC Address Error	55	Illegal data address (00H to 254H)	Check if the communication address is correct.	no
LOCAL Fault CE3 PC Data Error	56	Illegal data value	Check if the data value exceeds max/min value.	no
LOCAL Fault CE4 PC Slave Fault	57	Data is written to read-only address	Check to see if the correct communication address is being utilized.	no
LOCAL Fault CE10 PC TimeOut	58	Modbus transmission time-out	For a CE10 Fault to be displayed, the User must first have enabled the communication time out detection (P9.03 is not 3 and P9.05 is not 0). Should the drive not receive a message from the host computer (such as PC, HMI, PLC...) for the time set in P9.05 the drive will trigger the CE10 fault. Corrective action is to restore the communication between the host computer and the drive with messaging set lower/faster than the time set in P9.05.	no
LOCAL Fault CP10 Keypad Timeout	59	Keypad transmission time-out	For a CP10 Fault to be displayed the User must first enable the communication time out detection (P8.13 is not 3 and P8.14 is not 0). Should the drive not receive a message from Keypad for the time set in P8.14, the Drive will trigger the CP10 fault. Corrective action is to restore the communication between Keypad and the drive. Typical use for this parameter is for Remote Keypad use and monitoring of healthy Keypad to Drive communication.	no
LOCAL Fault bF Braking Fault	60	Brake resistor fault	If the fault code is still displayed on the keypad after pressing "RESET" key, please return to the factory.	no

(continued next page)

Fault Name	*Fault Code in Status Monitor 1*	*Fault Descriptions*	*Corrective Actions*	*Can be Bypassed in Fire Mode (Yes / no)*
LOCAL Fault ydc Y-Delta Connect	61	Y-connection/Δ-connection switch error	1) Check the wiring of the Y-connection/Δ-connection. 2) Check the parameters settings.	no
LOCAL Fault dEb DEB Error	62	When P6.61 is not set to 0 and momentary power is turned off, it will display dEb during accel/decel stop.	1) Set P6.61 to 0. 2) Check if input power is stable.	no
LOCAL Fault oSL Over Slip Error	63	It will be displayed when slip exceeds P2.26 setting and time exceeds P2.27 setting.	1) Check if motor parameter is correct (please decrease the load if overload). 2) Check the settings of P2.26 and P2.27.	no
LOCAL Fault ryF Emag SwitchError	64	Electric valve switch error when executing Soft Start. (This warning is for frames E and higher frame of GS4 drives)	Do not disconnect RST when drive is still operating.	no
n/a	65~71	reserved	n/a	n/a
LOCAL Fault STL1 STO Loss 1	72	STL1	STO1~SCM1 internal hardware detect error. (See Appendix E for corrective action.)	no
LOCAL Fault S1 ES1 E-Stop	73	Emergency stop for external safety	Fault S1 is generated upon a loss of the E-Stop input at ES1. The corrective action is to restore the E-Stop input to the drive at ES1.	no
LOCAL Fault Fire In Fire Mode	74	In Fire mode	Fire fault is due to the multi-function input set as 40 or 41 and that DI is ON. For some installations, particularly exhaust fan operation where smoke is detected and requires evacuation, it is highly desired for the drive to run the fan as long as is needed to exhaust that smoke.	Yes
n/a	75	reserved	n/a	n/a
LOCAL Fault STO STO	76	STO	Safety Torque Off function active. (See appendix E for corrective action.) If unknown STO faults occur, the onboard +24V might be getting shorted (+24V to DCM).	no

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Fault Name	*Fault Code in Status Monitor 1*	*Fault Descriptions*	*Corrective Actions*	*Can be Bypassed in Fire Mode (Yes / no)*
LOCAL Fault STL2 STO Loss 2	77	STL2	STO2~SCM2 internal hardware detect error. (See appendix E for corrective action.)	no
LOCAL Fault STL3 STO Loss 3	78	STL3	STO1~SCM1 and STO2~SCM2 internal hardware detect error. (See appendix E for corrective action.)	no
LOCAL Fault Uoc U Phase Short	79	Phase U short circuit		Yes
LOCAL Fault Voc V Phase Short	80	Phase V short circuit		Yes
LOCAL Fault Woc W Phase Short	81	Phase W short circuit		Yes
LOCAL Fault UPHL U Phase Loss	82	Output phase loss (Phase U)	Check to insure that the motor cable is properly connected to the drive.	Yes
LOCAL Fault VPHL V Phase Loss	83	Output phase loss (Phase V)	Check to insure that the motor cable is properly connected to the drive.	Yes
LOCAL Fault WPHL W Phase Loss	84	Output phase loss (Phase W)	Check to insure that the motor cable is properly connected to the drive.	Yes
n/a	85~89	reserved	n/a	n/a

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Fault Name	*Fault Code in Status Monitor 1*	*Fault Descriptions*	*Corrective Actions*	*Can be Bypassed in Fire Mode (Yes / no)*
LOCAL Fault FStp PLC Force Stop	90	If the GS4 drive is running in PLC mode, parameter P3.00 is equal to 1, 3 or 5, and Remote Operation is selected; or parameter P3.01 is equal to 1, 3, or 5, and Local operation is selected, the drive can be forced to stop by pressing the STOP key on the keypad.		no
n/a	91~96	reserved	n/a	n/a
LOCAL Fault CD10 Card TimeOut	97	Ethernet communication has not been received from the external controller (within the Ethernet Timeout window).	Initiate Ethernet communications from the master controller again, or Disable checking for Ethernet Timeout in P9.94.	
n/a	98	reserved	n/a	n/a
LOCAL Fault TRAP CPU Command Err	99	CPU trap error	Should a CPU Trap error fault persist, please send the drive back to the factory for evaluation.	no
n/a	100~111	reserved	n/a	n/a

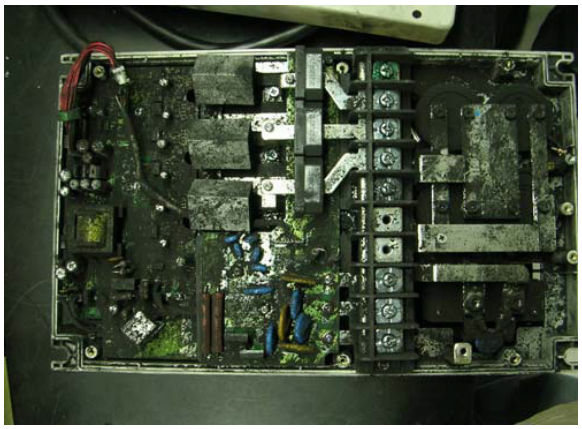
Typical AC Drive Problems and Solutions

Grease and Dirt Problems

In those industries where grease and dirt are common. Please be aware of the possible damage that grease, oil, and dirt, may cause to your GS4 drive:

1) *Electronic components that silt up with greasy oil may cause the drive to burn out or even explode.*
2) *Most greasy dirt contains corrosive substances that may damage the drive.*

Solution:
Install the GS4 drive in a suitable enclosure to protect it from grease and dirt. Clean and remove grease and dirt regularly to prevent damage of the drive.

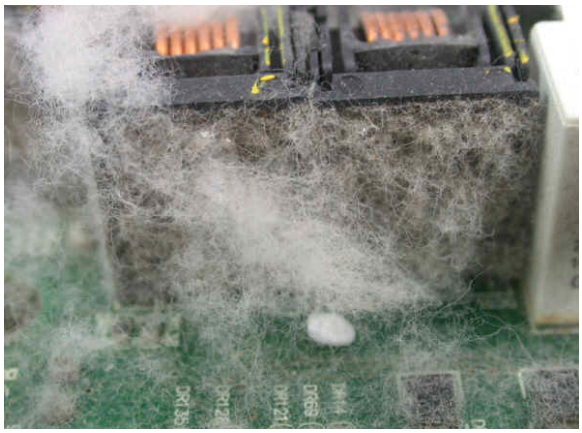


Fiber Dust Problem

Problems related to fiber dust are typical in the textile industry. Please be aware of the possible damage that fiber dust may cause to your GS4 drive:

1) *Fiber dust that accumulates or adheres to the fans will result in poor ventilation and cause overheating problems.*
2) *Textile plant environments with high humidity levels may experience GS4 drive failure or damage as a result of wet fiber dust adhering to components within the drive.*

Solution:
Install the GS4 drive in a suitable enclosure to protect it from fiber dust. Clean and remove fiber dust regularly to prevent damage to the drive.

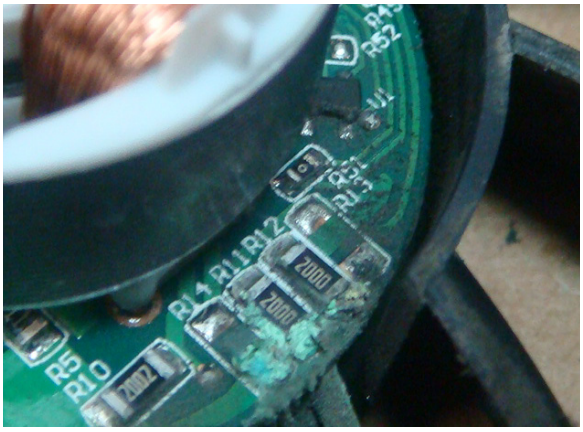


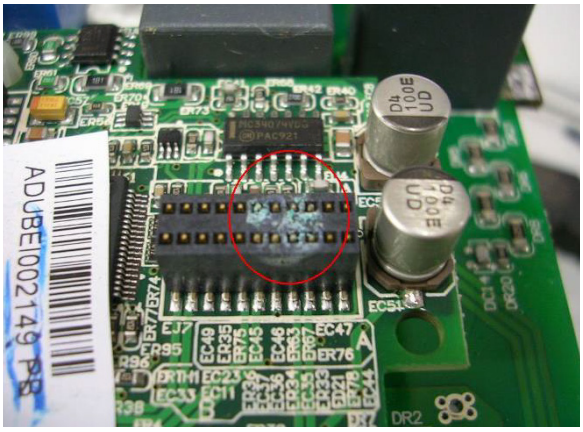
Corrosion Problem

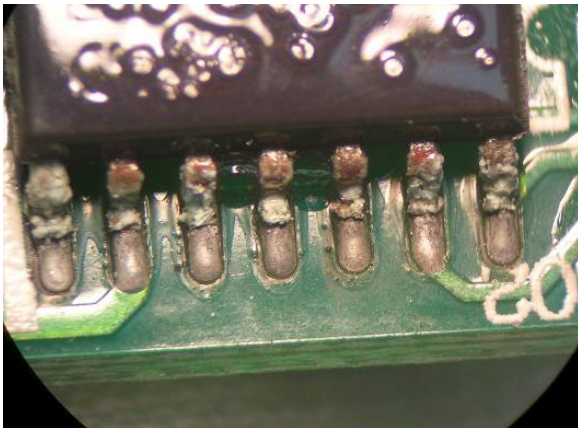
Corrosion problems may occur if any fluids or liquid in vapor form flows into the GS4 drive. Please be aware of the damage that corrosion may cause to your drive.

- *Corrosion of internal components may cause the GS4 drive to malfunction and possibly explode.*

Solution:
Install the GS4 drive in a suitable enclosure to protect it from fluids. Clean the drive regularly to prevent corrosion.







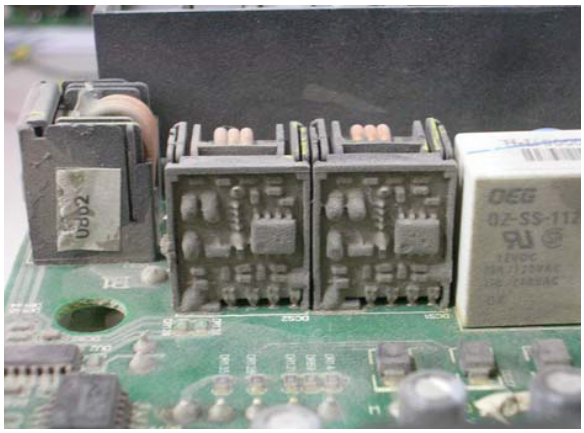
Industrial Dust Problem

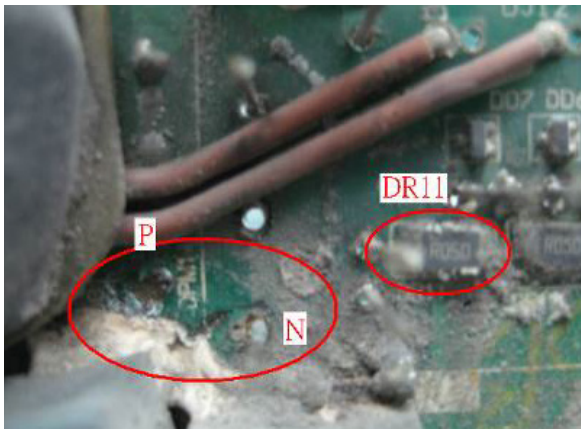
Serious industrial dust pollution frequently occurs in stone processing plants, flour mills, cement plants, and so on. Please be particularly aware of any metal dust, filings or if metalized vapor is present as these may cause damage to your drives:

1) *Dust accumulating on electronic components may cause overheating problems and shorten the service life of the drive.*
2) *Conductive dust may damage the circuit board and may cause the drive to explode.*

Solution:

Install the GS4 drive in a suitable enclosure and protect it from dust. Clean the cabinet and ventilation filter regularly for good ventilation.





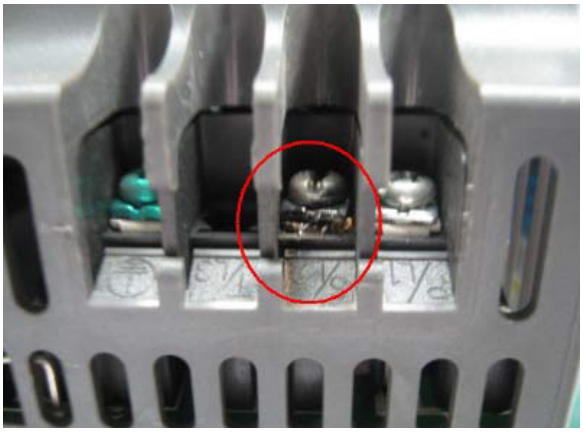
Wiring and Installation Problem

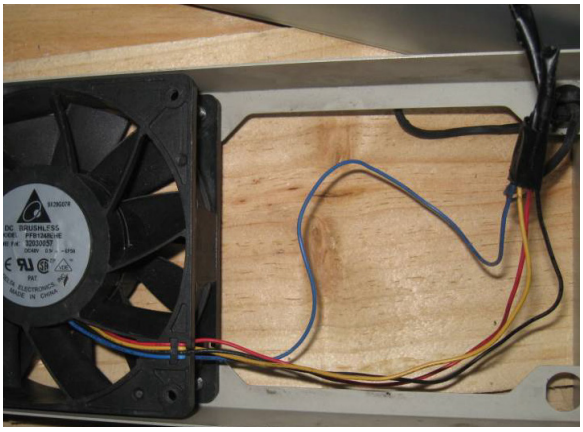
When wiring the GS4 drive, the most common problems are connection to the wrong terminal or poor wiring practice. Please be aware of the possible damage that poor wiring practice may cause to your GS4 drive:

1) *Screw terminals where the wire is not fully inserted or the terminal screw is not adequately tightened may result in sparking or high temperature due to a high resistance connection.*
2) *If circuit boards in the GS4 drive have been modified, components on the affected boards may have been damaged.*

Solution:

Inspect all power and control terminal connections in the GS4 drive to ensure adequate wire insertion. Do not attempt to disassemble or repair control boards in the GS4 drive.



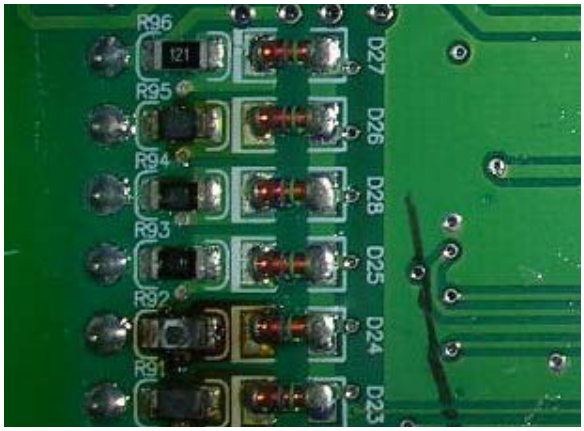


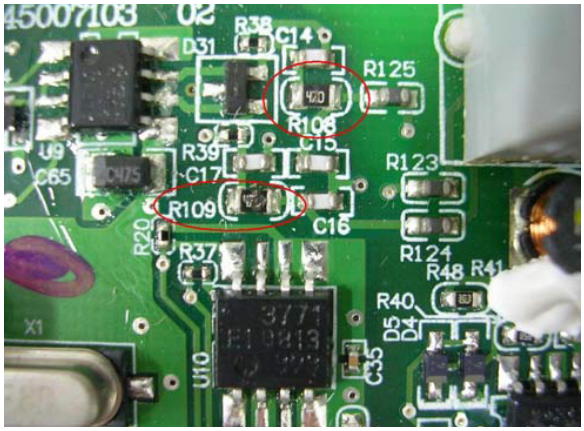
Digital Input/Output Terminal Problems

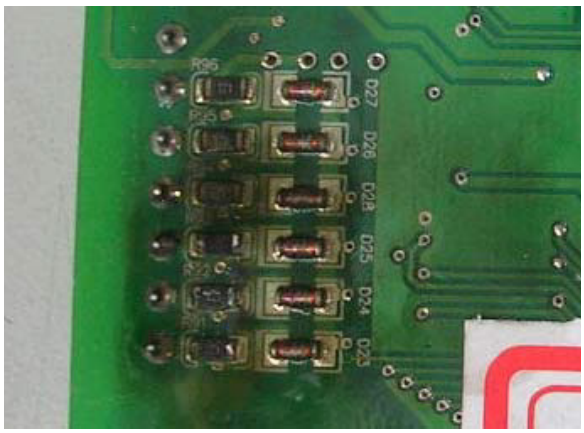
Problems with digital I/O are usually the result of improper termination, or failure to segregate control wiring from power wiring. This may result in errant signals due to induced voltage, capacitive coupling or electrical noise. Incorrect voltage levels applied to the digital I/O terminals can damage the I/O circuitry of the drive.

- *Input/Output circuit may burn out when the terminal usage exceeds its limit.*

Solution:
Refer to the user manual for multi-function input output terminals usage and follow the specified voltage and current. DO NOT exceed the specification limits.







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