# MAINTENANCE AND TROUBLESHOOTING



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CHAPTER

### **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 GS20(X) drive in its optimal condition, and to ensure a long life. We recommend that a qualified technician perform a regular inspection of the GS20(X) 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 GS20(X) 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 GS20(X) 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 GS20(X) DRIVE! WAIT AT LEAST FIVE MINUTES AFTER ALL DISPLAY LAMPS HAVE TURNED OFF.

- ☑ 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.
- $\square$  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

			<b>Maintenance Period</b>			
Check Items	Methods and Criteria	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	0				
If there are any dangerous objects	Visual inspection	0				

#### Voltage

		Maintenance Period		
Check Items	Methods and Criteria	Daily	Half Year	One Year
Check if the voltage of main circuit and control circuit is correct	Measure with multimeter with standard specification	0		

#### **Digital Keypad Display**

		<b>Maintenance Period</b>			
Check Items	Methods and Criteria	Daily	Half Year	One Year	
Is the display clear for reading	Visual inspection	$\bigcirc$			
Any missing characters	Visual inspection	$\bigcirc$			

#### **Mechanical parts**

		Mainte	enance	Period
Check Items	Methods and Criteria	Daily	Half Year	One Year
If there is any abnormal sound or vibration	Visual and audible inspection		$\bigcirc$	
If there are any loose screws	Tighten the screws		$\bigcirc$	
If any part is deformed or damaged	Visual inspection		$\bigcirc$	
If there is any color change due to overheating	Visual inspection		0	
If there is any dust or dirt	Visual inspection		$\bigcirc$	

# Recommended Inspection Schedules (continued)

#### Main circuit

		Mainte	enance	Period
Check Items	Methods and Criteria	Daily	Half Year	One Year
If there are any loose or missing screws	Tighten or replace the screw	$\bigcirc$		
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		$\bigcirc$	
If there is any dust or dirt	Visual inspection		$\bigcirc$	

# 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		0	
If the wiring insulation is damaged or there has been a color change	Visual inspection		0	
If there is any damage	Visual inspection	0		

# DC capacity of main circuit

Check Items	Methods and Criteria	<b>Maintenance Period</b>			
		Daily	Half Year	One Year	
If there is any liquid leaking, color change, crack or deformation	Visual inspection	0			
If the capacitor safety vent is bulging or inflated.	Visual inspection	0			
Measure static capacity when required (if drive overloads/faults during normal operation)	Measure with multimeter with standard specification	0			

### 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	0			
If there is any disconnection or discoloration	Visual inspection	0			
If the connection is damaged	Measure with a multimeter with standard specifications	0			

#### Transformer and reactor of main circuit

		Maintenance Period		
Check Items	Methods and Criteria	Daily	Half Year	One Year
If there is any abnormal vibration or peculiar smell	Visual, audible inspection and smell	0		

### Magnetic contactor and relay of main circuit

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

#### Printed circuit board and connector of main circuit

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

# Recommended Inspection Schedules (continued)

### Cooling fan of cooling system

		<b>Maintenance Period</b>			
Check Items	Methods and Criteria	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		$\bigcirc$		
If there is any loose screw	Tighten the screw		$\bigcirc$		
If there is any color change due to overheating	Change the fan		$\bigcirc$		

### Ventilation channel of cooling system

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

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

# TROUBLESHOOTING

## WARNING CODES

The GS20(X) 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.

For communication errors, "Upper unit" is referring to the Master controller of the serial network. Always ensure the communication settings of the drive (P09.01 and P09.04) match those of the master controller and network.



		1	W	arning Codes		
Display on GS20(X) Keypad	ID No.	Warning Name and Description	Action and Res	et	Co	prrective Action
n/a	0	No error	n/a	n/a	n/a	
			Action Level	When the function code is 03, 06, 10, and 63	1)	command is correct
		Communication error	Action Time Warning setting parameter	Immediately act	2)	Verify the wiring and grounding of the communication circuit. Separate the communication circuit from the
EE I	1	1 (CE1) RS-485 Modbus illegal function code.	Reset method	"Warning" occurs when P09.02=0 and the motor drive keeps running. The drive resets automatically when receiving the correct function code.	3)	main circuit, or wire in 90 degree for effective anti-interference performance. Check if the setting for P09.04 is the same as the setting for the upper
			Reset condition	Immediately reset	1	unit.
			Record	N/A	4)	Check the cable and replace it if necessary.
			Action Level	When the input data address is incorrect	1)	Check if the communication command is correct.
			Action Time	Immediately act	2)	Verify the wiring and grounding of
		Communication error	Warning setting parameter	N/A		the communication circuit. Separate the communication circuit from the
CE5	2	2 (CE2) RS-485 Modbus illegal data address	Reset method	"Warning" occurs when P09.02=0 and the motor drive keeps running. The drive resets automatically when receiving the correct data address.	3)	main circuit, or wire in 90 degree for effective anti-interference performance. Check if the setting for P09.04 is the same as the setting for the upper
			Reset condition	Immediately reset	]	unit.
			Record	N/A	4)	Check the cable and replace it if necessary.
			Action Level	When the length of communication data is too long	1)	Check if the communication command is correct.
			Action Time	Immediately act	2)	Verify the wiring and grounding of
	Communication error	Warning setting parameter	N/A		the communication circuit. Separate the communication circuit from the	
CE3	3	3 (CE3) RS-485 Modbus illegal data value	Reset method	"Warning" occurs when P09.02=0 and the motor drive keeps running. The drive resets automatically when receiving the correct communication data value.	3)	main circuit, or wire in 90 degree for effective anti-interference performance. Check if the setting for P09.04 is the same as the setting for the upper unit.
			Reset condition	Immediately reset	4)	
			Record	N/A		necessary.
			(conti	nued next page)		

)isplay on			vvarning	Codes (continued)		
GS20(X) Keypad	ID No.	Warning Name and Description	Action and Res	et	Corrective Action	
			Action Level	When the data is written to read-only address	<ol> <li>Check if the communication command is correct</li> </ol>	
			Action Time	Immediately act	2) Verify the wiring and grounding of	
		Communication error	Warning setting parameter	N/A	the communication circuit. Separat	
СЕЧ	4	4 (CE4) RS-485 Modbus data is written to read-only address	Reset method	"Warning" occurs when P09.02=0 and the motor drive keeps running. The drive resets automatically when receiving the correct written address of communication data.	<ul><li>main circuit, or wire in 90 degree for effective anti-interference performance.</li><li>3) Check if the setting for P09.04 is th same as the setting for the upper unit.</li></ul>	
			Reset condition	Immediately reset	4) Check the cable and replace it if	
			Record	N/A	necessary.	
			Action Level	When the communication time exceeds the detection time of P09.03 communication time- out	<ol> <li>Check if the upper unit transmits th communication command within th setting time for P09.03.</li> <li>Verify the wiring and grounding</li> </ol>	
			Action Time	P09.03	of the communication circuit. It	
		Communication error 10 (CE10)	Warning setting parameter	N/A	is recommended to separate the communication circuit from the	
CE 10	5	RS-485 Modbus transmission time-out	Reset method	"Warning" occurs when P09.02=0 and the motor drive keeps running. The drive resets automatically when receiving the next communication packet.	<ul> <li>main circuit, or wire in 90 degree for effective anti-interference performance.</li> <li>3) Check if the setting for P09.04 is the same as the setting for the upper</li> </ul>	
			Reset condition	Immediately reset	unit.	
			Record	N/A	4) Check the cable and replace it if	
5E I	7	Save error 1 (SE1) Keypad COPY error 1:	Action Level	"SE1" warning occurs when the GS4-KPD optional keypad does not transmit the COPY command to the drive, and does not transmit any data to the drive again in 10 ms at the time you copy the parameters to the drive.	necessary. SE1: The causes of error are mostly communication problems between the keypad and control board. Potential causes include communication signal interference and the unacceptable communication command to the Slave. Check if the error occurs randomly, or only occurs when copying certain	
		Keypad copy time-out	Action Time	10 ms	parameters (the error displays on the	
			Warning setting parameter	N/A	upper right corner of the copy page). If you cannot clear the error, please	
			Reset method	Manual reset (or cycle power)	contact AutomationDirect Technical	
			Reset condition	Immediately reset	Support.	
			Record Action Level	N/A "SE2" warning occurs when writing the parameters incorrectly at the time you copy parameters to the drive. For example, you copy the new firmware version with added	Support. SE2: In this stage, the copied data has been transmitted to the Slave. The Slave compares and processes the copied data, and then saves the data to the Data ROM. During the process, the data error (should be attribution error) may occur, or the data cannot be saved	
553	0	Save error 2 (SE2)		parameters to the drive with		
562	8	Save error 2 (SE2) Keypad COPY error 2:		old firmware version.	to EEPROM. At this time, the warning	
562	8		Action Time Warning setting	old firmware version. N/A		
5E2	8	Keypad COPY error 2:		old firmware version.	to ÉEPROM. At this time, the warning occurs.	
562	8	Keypad COPY error 2:	Warning setting	old firmware version. N/A	to ÉEPROM. At this time, the warning occurs. Check the status of Data ROM and	
562	8	Keypad COPY error 2:	Warning setting parameter	old firmware version. N/A N/A	to ÉEPROM. At this time, the warning occurs. Check the status of Data ROM and remove the error causes first.	

Display on								
GS20(X) Keypad	ID No.	Warning Name and Description	Action and Res	et	Со	prrective Action		
		IGBT over-heating warning (oH1)	Action Level Action Time	P06.15 "oH1" warning occurs when IGBT temperature is higher than	2)	of the control cabinet.		
		The AC motor drive detects IGBT overheating and	Warning setting parameter	P06.15 setting value.		Change the installed location if the are heating objects, such as braking resistors, in the surroundings. Install/add cooling fan or air		
оHI	9	exceeds the protection level of oH1 warning. (When P06.15 is	Reset method	Auto-reset		conditioner to lower the temperatu inside the cabinet. Check for and remove obstructions		
		higher than the IGBT overheating protection level, the drive shows oH1 error without displaying oH1	Reset condition	The drive auto-resets when IGBT temperature is lower than oH1 warning level minus (–) 5°C	7) 8)	or replace the cooling fan. Increase ventilation space of the drive. Decrease loading. Decrease the carrier wave.		
		warning.)	Record	N/A	9)	Replace the drive with higher capacity model.		
			Action Level	When the analog input is lower than 4 mA (only detects analog input 4–20 mA) P08.08	-			
		PID feedback error			Warning setting parameter	P08.09 setting is: 0: Warn and continue operation 1: Fault and ramp to stop 2: Fault and coast to stop 3: Warn and operate at last frequency	1)	Check the PID feedback wiring and tighten the terminals.
PI d	11	(PID) PID feedback loss (warning for analog feedback signal; works only when PID enables)	Reset method	<ol> <li>Auto: "Warning" occurs when P08.09=0 or 3. The "Warning" automatically clears when the feedback signal is larger than 4 mA.</li> <li>Manual: "Error" occurs when P08.09=1 or 2. You must reset manually.</li> </ol>	3)	Replace the cable.		
		Reset condition	Immediately reset					
			Record	Records when P08.09=1 or 2 ("Error"). Does not record when P08.09=3 ("Warning").				

UI       13       Under current (uC)         UI       13       Under current (uC)         UI       13       Under current (uC)         Low current       Reset method       2: Fault and coast to stop 2: Fault and coast	Warning Codes (continued)								
Action Level       than 4 mA (only detects analog)         Action Time       Immediately act         Action Time       Immediately act         Analog input current (An.l)       Analog input current analog 4-20 mA signals)       Neplace the cable.         Analog input current analog 4-20 mA signals)       Reset method       Neplace the cable.         Action Time       Neplace the cable.       Replace the cable.         Warning * automatically clears when the feedback.       Replace the cable.       Replace the cable.         Warning * automatically clears when the feedback.       Natus: "Kron" occurs when P03.19-3. You must reset manually.       Replace the cable.         Warning * automatically clears when the feedback.       Natus: "Kron" occurs when P03.19-3. You must reset manually.       I         Under current (uC) Low current       Reset method       P66.73 setting it: 0. No function itme 3. Warn and continue operation 1. Auto: "Warning" occurs when P06.73-3. The "Warning" automatically clears when the output current is larger than (SPA)       I       Check for a broken motor cable, ther exclude the connection issue of the motor and its load.         Under current (uC) Low current       Reset method       I. Auto: "Warning" occurs when P06.73-3. The "Warning" automatically clears when the doupt current is larger than (SPA)       I. Check for a broken motor cable, ther exclude the connection issue of the motor and its load.         P657P       17       P66.72       I. Maruin	GS20(X) I	D No.		Action and Res		Co	rrective Action		
PAIL       12       Al2 analog signal los: (Ani)       Warning setting barameter       P03.19 setting is: Collisable in Continue operation at the last frequency (warning, keypad display ANI).       December to 0 Hz (warning, keypad display ANI).       December to 0 Hz (warning, warning, automatically clears when P03.19=1 or 2. The "Warning" automatically clears when P03.19=3 rou must reset manually.       December to 0 Hz (warning, automatically clears when P03.19=3, You must reset manually.       December to 0 Hz (warning, automatically clears when P03.19=3, You must reset manually.       December to 0 Hz (warning)				Action Level	than 4 mA (only detects analog				
Under current (uC)       13       Under current (uC)       Notic: "Warning" automatically clears when the feedback is grant and continue operation time point and is larger than and continue operation time streng and maximum to stop by the 2nd deceleration time 2Nd for 2nd point and the origon tank and continue operation time streng "automatically clears when the output clears when the output clears when the streng all the writing contact AutomationDirect Technical Support.       1         ULC       13       Under current (uC)       Action Level       P06.73 setting is: "On function time point on the output clears when the	AoL	12	(AnL)	Warning setting	Immediately act P03.19 setting is: 0: Disable 1: Continue operation at the last frequency (warning, keypad displays ANL) 2: Decelerate to 0 Hz (warning, keypad displays ANL) 3: Stop immediately and display	2)	terminals. Replace the cable.		
Image: Construct of the second seco			loss (including all analog 4–20 mA		<ul> <li>when P03.19=1 or 2. The "Warning" automatically clears when the feedback signal is larger than 4 mA.</li> <li>2) Manual: "Error" occurs when P03.19=3. You must reset manually.</li> </ul>	4)	If the AnL error still occurs after		
UL       13       Under current (uC)       Action Time       P06.73         ULC       13       Under current (uC)       Warning setting parameter       2: Fault and coast to stop 2: Fault and coast to stop 2: Fault and coast to stop 2: Fault and continue operation 1: Action Time       1)       Action Time         Under current (uC)       Low current       Reset method       1)       Auto: "Warning" automatically clears when the output current is larger than (P06.71+0.1 A).       2)       Verify low current protection settings the motor capacity.         Wernone       Reset condition       Immediately reset       Does not record when P06.73= and UC displays ("Warning").       Check the loading status and make sure the loading matches the motor capacity.         Wer speed warning (oSPd)       Over speed warning (oSPd)       Action Time       P10.11       2)         Over speed warning (oSPd)       Reset method       The encoder feedback speed > p10.10       1)       Verify setting of P10.25. Decrease value if needed.         Over speed warning (oSPd)       Over speed warning       Reset method       The encoder feedback speed > p10.11       2)         Over speed warning       Reset method       P10.12=0       1)       Verify setting of P10.25. Decrease value if needed.         Over speed warning       Reset method       P10.12=0       1)       Verify bandwidth setting for ASR speed control and increase the bandwidth setting of					Does not record when	-			
Image: Constraint of the second se	UC	13		Action Time Warning setting parameter Reset method	<ul> <li>P06.71</li> <li>P06.72</li> <li>P06.73 setting is:</li> <li>O: No function</li> <li>1: Fault and coast to stop</li> <li>2: Fault and ramp to stop by the</li> <li>2nd deceleration time</li> <li>3: Warn and continue operation</li> <li>1) Auto: "Warning" occurs when P06.73=3. The "Warning" automatically clears when the output current is larger than (P06.71+0.1 A).</li> <li>2) Manual: "Error" occurs when P06.73=1 or 2. You must reset manually.</li> </ul>	2)	motor and its load. Verify low current protection settings. If needed, set the proper settings for P06.71, P06.72 and P06.73. Check the loading status and make sure the loading matches the motor		
Record N/A of the main circuit to prevent interference.	oSPd	17	(oSPd)	Action Level Action Time Warning setting parameter Reset method Reset condition	P06.73=3 and uC displays ("Warning"). The encoder feedback speed > P10.10 P10.11 P10.12=0 0: Warn and continue operation "Warning" automatically clears when the drive stops "Warning" automatically clears when the drive stops	2)	value if needed. Verify bandwidth setting for ASR speed control and increase the bandwidth setting if needed. Reset motor parameter and run parameter tuning. Verify the wiring of the control circuit, and the wiring/grounding of the main circuit to prevent		

		-	Warning	Codes (continued)	
Display on GS20(X) Keypad	ID No.	Warning Name and Description	Action and Res	et	Corrective Action
			Action Level	P10.13	1) Verify parameter setting for slip
			Action Time	P10.14	error and reset value for P10.13 and
		Deviation Warning	Warning setting parameter	P10.15 Encoder Stall and Slip Error Action =0 0: Warn and continue operation	<ul> <li>P10.14 if needed.</li> <li>2) Reset ASR parameters and set propaccel./ decel. time.</li> <li>3) Verify motor status and remove any causes if the motor is locked.</li> </ul>
dRuE	18	(dAvE) Over speed deviation warning	Reset method	"Warning" automatically clears when the drive stops	<ul><li>4) Check status of the mechanical bra and verify the action timing of the system if the brake is not released.</li><li>5) Verify torque limit and adjust</li></ul>
			Reset condition	After the drive stops	<ul> <li>parameters P06.12 and P11.17-P11.20 as needed.</li> <li>6) Verify the wiring of the control circuit, and the wiring/grounding</li> </ul>
			Record	N/A	of the main circuit to prevent interference.
			Action Level	One of the phases outputs less than P06.47	<ol> <li>Verify the wiring of the main circuit</li> <li>Verify a single-phase power input</li> </ol>
			Action Time	P06.46	is not being used on a three-phase model. Use the model with voltage
		Phase loss	Warning setting parameter	P06.45 Output Phase Loss Detection Action (OPHL) =0 0: Warn and continue operation	<ul><li>that matches the power.</li><li>3) If the power of main circuit works well, check if the MC of the main circuit is broken. Cycle the</li></ul>
PHL	19	(PHL) 9 Input phase loss warning	Reset method	"Warning" automatically clears when the drive stops	<ul> <li>power after verifying the power is normal. If PHL still occurs, contact AutomationDirect Technical Suppo</li> <li>1 Tighten the terminal screws with th</li> </ul>
			Reset condition	After the drive stops	<ul> <li>torque listed in the user manual.</li> <li>5) Verify the input cable is not broken Make sure the wiring is correct.</li> <li>Replace the broken part of the cab</li> </ul>
			Record	N/A	<ul><li>6) Verify the three-phase power is not unbalanced.</li></ul>
			(conti	nued next page)	

			Warning	Codes (continued)	
Display on GS20(X) Keypad	ID No.	Warning Name and Description	Action and Res		Corrective Action
	<i>ID No.</i> 20		Action and Res Action Level Action Time Warning setting parameter Reset method	P06.07         P06.08         P06.06 Over-torque Detection         Selection (Motor 1) =1 or 3         0: No function         1: Continue operation after         over-torque detection during         constant speed operation         2: Stop after over-torque         detection during constant         speed operation         3: Continue operation after         over-torque detection during         RUN         4: Stop after over-torque         detection during RUN         When the output current         < P06.07, the ot1 warning	<ul> <li>Corrective Action</li> <li>1) Configure the settings for P06.07 and P06.08 again.</li> <li>2) Check for mechanical error and remove the causes of malfunction.</li> <li>3) Verify load and decrease the loading or replace with a motor with larger capacity if load is too high.</li> <li>4) Verify accel/decel time and increase the setting values for P01.12–P01.19 (accel./ decel. time) if work cycle is too short.</li> <li>5) Verify V/F voltage and adjust the V/F curve (Motor 1, P01.01–P01.08), especially the setting value for the mid-point voltage (if the mid-point voltage is set too small, the load capacity decreases at low-speed).</li> <li>6) Replace motor with a larger capacity motor.</li> <li>7) Check for overload during low-speed operation and decrease the loading during low-speed operation or</li> </ul>
			Reset condition Record	automatically clears When the output current < P06.07, the ot1 warning automatically clears N/A	<ul> <li>increase the motor capacity.</li> <li>8) Verify torque compensation and adjust P07.26 torque compensation gain until the output current decreases and the motor does not stall.</li> <li>9) Correct the parameter settings for speed tracking. Start the speed tracking function. Adjust the maximum current for P07.09 speed tracking.</li> </ul>
1			(conti	nued next page)	·

			Warning	Codes (continued)	
Display on GS20(X) Keypad	ID No.	Warning Name and Description	Action and Res		Corrective Action
Keypad		Description	Action Level Action Time Warning setting parameter	P06.10 P06.11 P06.09 Over-torque Detection Selection (Motor 2) = 1 or 3 0: No function 1: Continue operation after over-torque detection during constant speed operation 2: Stop after over-torque detection during constant speed operation 3: Continue operation after over-torque detection during	<ol> <li>Configure the settings for P06.10 and P06.11 again.</li> <li>Check for mechanical error and remove the causes of malfunction.</li> <li>Verify load and decrease the loading or replace with a motor with larger capacity if load is too high.</li> <li>Verify accel/decel time and increase the setting values for P01.12–P01.19 (accel./ decel. time) if work cycle is too short.</li> <li>Verify V/F voltage and adjust the V/F curve (Motor 2, P01.35–P01.42), especially the setting value for the mid-paint values for the</li> </ol>
o£2	21	Over-torque (ot2) Over-torque 2 warning	Reset method	RUN 4: Stop after over-torque detection during RUN When the output current < P06.10, the ot2 warning automatically clears	<ul> <li>mid-point voltage (if the mid-point voltage is set too small, the load capacity decreases at low-speed).</li> <li>6) Replace motor with a larger capacity motor.</li> <li>7) Check for overload during low-speed operation and decrease the loading during low-speed operation or increase the motor capacity.</li> </ul>
			Reset condition	When the output current < P06.10, the ot2 warning automatically clears	<ul> <li>8) Verify torque compensation and adjust P07.71 torque compensation gain until the output current decreases and the motor does not stall.</li> <li>9) Correct the parameter settings for</li> </ul>
			Record	N/A nued next page)	speed tracking. Start the speed tracking function. Adjust the maximum current for P07.09 speed tracking.

			Warning	Codes (continued)	I
Display on GS20(X) Keypad	ID No.	Warning Name and Description	Action and Res	et	Corrective Action
			Action Level	P03.00=6 (PTC), PTC input level > P06.30 PTC level (default=50%)	<ol> <li>Check if motor is locked and clear the motor lock status.</li> <li>Verify load and decrease the loading or replace with a motor with larger</li> </ol>
			Action Time	Immediately act	<ul><li>capacity if load is too high.</li><li>3) Verify ambient temperature and change the installed location if</li></ul>
ьHЭ	22_1	Motor over-heating (oH3) PTC Motor overheating warning. The AC motor	Warning setting parameter	Error treatment: P06.29 0: Warn and continue operation 1: Fault and ramp to stop 2: Fault and coast to stop 3: No warning When P06.29=0 and when the temperature is ≤ P06.30 level, the oH3 warning automatically clears. When P06.29=0 ("Warning"), it automatically resets.	there are heating devices in the surroundings, or install/add cooling fan or air conditioner to lower the ambient temperature.
		drive detects the temperature inside the motor is too high	Reset method	When P06.29=0, oH3 displays as "Warning". When the temperature is $\leq$ P06.30 level, the oH3 warning automatically clears.	<ul> <li>8) Verify V/F voltage and adjust settings for P01.01–P01.08 (V/F curve), especially the setting value for the mid-point voltage (if the mid-point voltage is set too small, the load capacity decreases at low-speed).</li> <li>9) Verify the motor rated current</li> </ul>
			Reset condition	When the temperature is ≤ P06.30 level, the oH3 warning automatically clears.	<ul> <li>matches the motor nameplate and configure the correct rated current value of the motor if needed.</li> <li>10) Check the connection between PTC thermistor and the heat protection.</li> <li>11) Verify stall prevention setting and set the stall prevention to the proper</li> </ul>
			Record	N/A	value if needed. 12) Check for unbalanced three-phase motor impedance. Replace the motor if needed. 13) Verify harmonics and reduce harmonics if too high.
		Over elip warning (eCL)	Action Level	When the drive outputs at constant speed, and F>H or F <h exceeds="" level<="" p07.29="" td="" the=""><td></td></h>	
		Over slip warning (oSL)	Action Time	P07.30	
o5L	24	Over slip warning. By using the maximum slip (P10.29) as the base, when the drive	Warning setting parameter	P07.31=0 Warning 0: Warn and continue operation 1: Fault and ramp to stop 2: Fault and coast to stop 3: No warning	<ol> <li>Check the motor parameter.</li> <li>Verify load and decrease the loading if needed.</li> </ol>
υJL		outputs at constant speed, and the F>H or F <h exceeds="" p07.29<br="">level and P.07.30 setting time, 100% P07.29 = P10.29.</h>	Reset method Reset condition	When P07.31=0 and when the drive outputs at constant speed, and F>H or F <h no<br="">longer exceeds the P07.29 level, the oSL warning automatically clears. N/A</h>	<ol> <li>Verify the parameter settings for oSL protection (P07.29, P07.30, and P10.29) are correctly set.</li> </ol>
			Record	N/A	1
			(conti	nued next page)	

Display on				Codes (continued)		
GS20(X) Keypad	ID No.	Warning Name and Description	Action and Res	et	Corrective Action	
		Auto tuning (tUn)	Action Level	When running P05.00 motor parameter auto-tuning, the keypad displays "tUn".		
		Auto tuning (ton)	Action Time	N/A	_	
ЕUn	25	Parameter auto-tuning is processing.	Warning setting parameter	N/A	When the auto-tuning is finished, the	
	23	When running auto- tuning, the keypad displays "tUn".	Reset method	When auto-tuning is finished and no error occurs, the warning automatically clears.	warning automatically clears.	
		displays ton .	Reset condition	When auto-tuning is finished and no error occurs.		
			Record	N/A		
			Action Level	P06.47	1) Check for unbalanced three-phase motor impedance and replace the	
			Action Time	N/A	motor if needed. 2) Check the cable and replace if	
oPHL	28	Output phase loss (oPHL) Output phase loss of the drive	(oPHL)	Warning setting parameter	P06.45 setting is: 0: Warn and continue operation 1: Fault and ramp to stop 2: Fault and coast to stop 3: No warning	<ul> <li>needed.</li> <li>3) Ensure a three-phase motor is being used.</li> <li>4) Check if the control board cable is loose. If yes, reconnect the cable an run the drive to test. If the error still</li> </ul>
			Reset method	If P06.45 is set to 0, the oPHL warning automatically clears after the drive stops.	<ul> <li>occurs, contact AutomationDirect Technical Support.</li> <li>5) Check if the three-phase current is balanced with a current clamp meter If the current is balanced and the</li> </ul>	
			Reset condition	N/A	oPHL error still shows on the displa contact AutomationDirect Technical	
			Record	N/A	<ul><li>6) Verify the drive's capacity matches a exceeds the motor's.</li></ul>	
5E3 30		Copy model error 3	Action Level	"SE3" warning occurs when different drive identity codes are found during copying parameters.		
	30	(SE3)	Action Time	Immediately act when the error is detected	It is mainly to prevent parameter copies	
		Keypad COPY error 3: copy model error	Warning setting parameter	N/A	between different HP/models.	
			Reset method	Manual reset		
				N/A	4	
			Record	N/A		

			Warning	Codes (continued)	
Display on GS20(X) Keypad	ID No.	Warning Name and Description	Action and Res	et	Corrective Action
			Action Level	P14.75	1) Configure the settings for P14.75 and P14.76 again.
			Action Time	P14.76	<ol> <li>2) Check for mechanical error and remove the causes of malfunction.</li> <li>3) Verify load and decrease the loading</li> </ol>
o£3	31	Over-torque (ot3) Over-torque 3 warning	Warning setting parameter	P14.74 Over-torque Detection Selection (Motor 3) = 1 or 3 0: No function 1: Continue operation after over-torque detection during constant speed operation 2: Stop after over-torque detection during constant speed operation 3: Continue operation after over-torque detection during RUN 4: Stop after over-torque detection during RUN	<ul> <li>or replace with a motor with larger capacity if load is too high.</li> <li>4) Verify accel/decel time and increase the setting values for P01.12–P01.19 (accel./ decel. time) if work cycle is too short.</li> <li>5) Verify V/F voltage and adjust the V/F curve (Motor 3, P01.54–P01.61), especially the setting value for the mid-point voltage (if the mid-point voltage is set too small, the load capacity decreases at low-speed).</li> <li>6) Replace motor with a larger capacity motor.</li> <li>7) Check for overload during low-speed operation and decrease the loading during low-speed operation or increase the motor capacity.</li> </ul>
			Reset method	When the output current < P14.75, the ot3 warning automatically clears	<ul> <li>8) Verify torque compensation and adjust P07.73 torque compensation gain until the output current decreases and the motor does not</li> </ul>
			Reset condition	When the output current < P14.75, the ot3 warning automatically clears	<ul> <li>stall.</li> <li>9) Correct the parameter settings for speed tracking. Start the speed tracking function. Adjust the</li> </ul>
			Record	N/A	maximum current for P07.09 speed tracking.
			(conti	nued next page)	

Display on			Warning	Codes (continued)	
	ID No.	Warning Name and Description	Action and Res	et	Corrective Action
			Action Level	P14.78	1) Configure the settings for P14.78 and P14.79 again.
			Action Time	P14.79	<ol> <li>Check for mechanical error and remove the causes of malfunction.</li> <li>Verify load and decrease the loading</li> </ol>
oE4	32	Over-torque (ot4) Over-torque 4 warning	Warning setting parameter	<ul> <li>P14.77 Over-torque Detection</li> <li>Selection (Motor 4) =1 or 3</li> <li>O: No function</li> <li>1: Continue operation after</li> <li>over-torque detection during</li> <li>constant speed operation</li> <li>2: Stop after over-torque</li> <li>detection during constant</li> <li>speed operation</li> <li>3: Continue operation after</li> <li>over-torque detection during</li> <li>RUN</li> <li>4: Stop after over-torque</li> <li>detection during RUN</li> </ul>	<ul> <li>or replace with a motor with larger capacity if load is too high.</li> <li>4) Verify accel/decel time and increase the setting values for P01.12–P01.19 (accel./ decel. time) if work cycle is too short.</li> <li>5) Verify V/F voltage and adjust the V/F curve (Motor 3, P01.63–P01.70), especially the setting value for the mid-point voltage (if the mid-point voltage is set too small, the load capacity decreases at low-speed).</li> <li>6) Replace motor with a larger capacity motor.</li> <li>7) Check for overload during low-speed operation and decrease the loading</li> </ul>
			Reset method	When the output current < P14.78, the ot4 warning automatically clears	<ul> <li>during low-speed operation or increase the motor capacity.</li> <li>8) Verify torque compensation and adjust P07.75 torque compensation gain until the output current</li> </ul>
			Reset condition	When the output current < P14.79, the ot4 warning automatically clears	<ul><li>decreases and the motor does not stall.</li><li>9) Correct the parameter settings for speed tracking. Start the speed</li></ul>
			Record	N/A	tracking function. Adjust the maximum current for P07.09 speed tracking.
			Action Level	During PLC downloading, the program source code detects incorrect address (e.g. the address exceeds the range), then the PLod warning occurs.	
PLod		PLC opposite defect	Action Time	Immediately act when the fault is detected	
	50	(PLod) PLC download error warning	Warning setting parameter	N/A	Verify the data number used when downloading the PLC program and use
			Reset method	Check if the program is correct and download the program again. If the fault does not exist, the warning automatically clears.	the correct data number.
			Reset condition Record	N/A N/A	-
PLSu	51	PLC save memory error (PLSv) Data error during PLC operation	Action Level	The program detects incorrect written address (e.g. the address exceeds the range) during PLC operation, then the PLSv warning occurs.	
			Action Time Warning setting	Immediately act when the fault is detected	Make sure the written address is correc and download the program again.
			Reset method	N/A Check if the program is correct and download the program again. If the fault does not exist, the warning automatically clears.	
			Reset condition	N/A	
			Record	N/A nued next page)	

			Warning	Codes (continued)	
Display on GS20(X) Keypad	ID No.	Warning Name and Description	Action and Res	et	Corrective Action
			Action Level	The program detects incorrect written address when translating the program source code (e.g. the address exceeds the range) during PLC downloading, then PLdA warning occurs.	
PLdA	50	Data defect (PLdA)	Action Time	Immediately act when the fault is detected	Check if the upper unit transmits the
FLOR	52	Data error during PLC operation	Warning setting parameter	N/A	correct command.
			Reset method	Check if the program is correct and download the program again. If the fault does not exist, the warning automatically clears.	
			Reset condition	N/A	
			Record	N/A	
			Action Level	The program detects incorrect command (unsupported command) during PLC downloading, then PLFn warning occurs.	
	53	Function defect (PLFn) PLC download function code error	Action Time	Immediately act when the fault is detected	Check the drive firmware and if not the latest version, download and install the latest version from the ADC support website
PLFn			Warning setting parameter	N/A	
			Reset method	Check if the program is correct and download the program again. If the fault does not exist, the warning automatically clears.	
			Reset condition	N/A	
			Record	N/A	
			Action Level	When PLC runs the last command and the command exceeds the maximum capacity of the program, then PLor warning occurs.	
PLor	54	PLC buffer overflow (PLor) PLC register overflow	Action Time	Immediately act when the fault is detected	Follow the steps below to reset the PLC software:
			Warning setting	N/A	1) Disable PLC
			parameter Reset method	Check if the program is correct and download the program again. If the fault does not exist, the warning automatically clears.	<ol> <li>Reset the PLC program (P00.02=6)</li> <li>Enable PLC</li> <li>Re-download the PLC program</li> </ol>
			Reset condition	N/A	
			Record	N/A	
			(contii	nued next page)	

Display on			Warning	Codes (continued)	
Display on GS20(X) Keypad	ID No.	Warning Name and Description	Action and Res	et	Corrective Action
			Action Level	The program detects incorrect command (unsupported command) during PLC operation, then PLFF warning occurs.	
		Function defect (PLFF)	Action Time	Immediately act when the fault is detected	When starting the PLC function and
PLFF	55	Function code error	Warning setting parameter	NA	there is no program in the PLC, the PLFF warning occurs. This is a normal warning
		during PLC operation	Reset method	Check if the program is correct and download the program again. If the fault does not exist, the warning automatically clears.	please download the program.
			Reset condition	N/A	-
			Record Action Level	N/A PLC checksum error is detected after the drive is powered on, then PLSn warning occurs.	
			Action Time	Immediately act when the fault is detected	Follow the steps below to reset the PLC
	5.0	Checksum error (PLSn) PLC checksum error	Warning setting parameter	NA	software: 1) Disable PLC 2) Reset the PLC program (P00.02=6) 3) Enable PLC 4) Re-download the PLC program
PLSn	56		Reset method	Check if the program is correct and download the program again. If the fault does not exist, the warning automatically clears.	
			Reset condition	N/A	
			Record Action Level	N/A The "End" command is missing. Until the last command is executed, the PLEd warning occurs.	
PLEd 57		No end command (PLEd) PLC end command is missing	Action Time	Immediately act when the fault is detected	Follow the steps below to reset the PLC software: 1) Disable PLC 2) Reset the PLC program (P00.02=6) 3) Enable PLC 4) Re-download the PLC program
	57		Warning setting parameter	NA	
	51		Reset method	Check if the program is correct and download the program again. If the fault does not exist, the warning automatically clears.	
			Reset condition	N/A	-
			Record Action Level	N/A The MC command is detected during PLC operation, but there is no corresponding MCR command, then the PLCr warning occurs.	
PLEr	58	PLC MCR error (PLCr) PLC MCR command error	Action Time	Immediately act when the fault is detected	The MC command cannot be used
			Warning setting parameter	NA	The MC command cannot be used continuously for 9 times. Check and reset the program, then re-download th program.
			Reset method	Check if the program is correct and download the program again. If the fault does not exist, the warning automatically clears.	
			Reset condition Record	N/A N/A	
				nued next page)	1

Display on GS20(X) Keypad         ID No.         Warning Name and Description         Action and Reset         Corrective Action           PLC download fail (PLdF)         PLC download fail (PLdF)         Action Level         PLC download failure (PLdF)         PLC download failure (PLdF)         Action Time         Immediately act when the fault is detected         Check for programming errors, if the fault download the program again. download the program again.         Check for programming errors, if the exist, correct and download the program again. Reset condition         Check for Source Code errors, if the exist, correct and download the program again. download the program again.         Action Level         When the PLC scan time exceeds the maximum allowable time (400 ms), the PLS scan time exceeds the maximum allowable time         Check for programming errors, if they exist, correct and download the program again. Reset condition         NA           PL SF         F0         PLC scan time fail (PLSF)         Action Level         When the PLC scan time exceeds the maximum allowable time (400 ms), the PLS warning automatically clears. Reset condition         NA         Check for Source Code errors, if the exist, correct and download the pro again.           PL SF         F0         PLC scan time exceeds the maximum allowable time         Reset method         Check for programming errors, if the y exist, correct and download the program again. If the fault does not exist, the warning automatically clears.         Check for source Code errors, if the exist, correct and download the pro again.           PL Set warning acrore scale <th>egram</th>	egram
PLG       for the maximum allowable time       Action Level       momentary power loss during download. After the power is again present, the PLdF warning occurs.       Action Time       Immediately act when the fault is detected       Check for programming errors, if the set, correct and download the programming errors, if they exist, correct and download the programming errors, if they exist, correct and download the programming errors, if they exist, correct and download the program again.       Check for programming errors, if the exist, correct and download the program again.         PLC for the program in the program again.       Reset method       Check for programming errors, if they exist, correct and download the program again.       Check for programming errors, if the exist, correct and download the program again.         PLC Scan time fail (PLSF)       PLC scan time exceeds the maximum allowable time (400 ms), the PLS warning occurs.       Check for programming errors, if the exist, correct and download the program again.         PL SF       for the maximum allowable time       Check for programming errors, if the exist, correct and download the program again.         PL Sr       Reset method       Check for programming errors, if the exist, correct and download the program again.         PL Sr       Reset method       Check for programming errors, if the exist, correct and download the program again.         PL Sr       Reset method       Check for programming errors, if the exist, correct and download the program again.         PL Sr       Reset condition       N/A       NA	egram
PL dF       59       PLC download fail (PLdF)       is detected       is detected       Check for programming errors, if the exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       Check for programming errors, if they exist, correct and download the program again.       Check for programming errors, if they exist, correct and download the program again.       Check for programming errors, if they exist, correct and download the program again.       Check for programming errors, if they exist, correct and download the program again.         PL SF       60       PLC scan time fail (PLSF)       Action Level       Marning setting parameter       NA         PL SF       60       PLC scan time exceeds the maximum allowable time (400 ms), the PLSF warning occurs.       Check for programming errors, if the exist, correct and download the program again.       Check for Source Code errors, if the exist, correct and download the program again.         PL SF       60       PLC scan time exceeds the maximum allowable time       Check for programming errors, if the exist, correct and download the program again.       Check for Source Code errors, if the exist, correct and download the program again.         Reset condition       N/A       Reset condition       N/A       PLC         Reset condition       N/A       Reset condition       N/A       PLSF         60       PLC scan time exceeds the maximum allowable time fault is detected       If the fault does not exist, the warning automatically clears.<	egram
PLdF       59       (PLdF) PLC download failure       Warning setting parameter       NA       exist, correct and download the programing errors, if they exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       again.         PLSF       60       PLC scan time fail (PLSF)       Action Level       NA       exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       Check for Source Code errors, if the PLS scan time fail (PLSF)         PLC scan time fail (PLSF)       Action Time       Immediately act when the fault is detected       Check for programming errors, if they exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       Check for Source Code errors, if the exist, correct and download the program again. If the fault does not exist, the warning automatically clears.         Reset condition       N/A       Reset condition       N/A         Reset condition       N/A       Check for programming errors, if they exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       Check for Source Code errors, if the exist, correct and download the program again.         Reset condition       N/A       NA       Action Time again.       Immediately clears.         Reset condition       N/A       The SV power that the drive provides to the communication       1)       Make sure the communication well inserted and not loose. <td>egram</td>	egram
PLC download failure       PLC download failure       Check for programming errors, if they exist, correct and download the program again. If the fault does not exist, the warning automatically clears.         Reset condition       N/A         Reset condition       N/A         Reset condition       N/A         Reset condition       N/A         PLC scan time fail (PLSF)       Action Level         PLC scan time exceeds the maximum allowable time       Action Time         Immediately act when the fault is detected       Check for Source Code errors, if the exist, correct and download the program again. If the fault does not exist, the warning automatically clears.         Reset method       Reset method       NA         Reset method       Reset method       Immediately act when the fault is detected         Warning setting parameter       NA       Check for Source Code errors, if the exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       Check for source code errors, if the exist, correct and download the program again. If the fault does not exist, the warning automatically clears.         Reset condition       N/A       Record       N/A         Record       N/A       The 5V power that the drive provides to the communication       1) Make sure the communication	
PLSF       60       Reset condition       N/A         PLSF       For the maximum allowable       Action Level       When the PLC scan time exceeds the maximum allowable time (400 ms), the PLSF warning occurs.       Action Time       When the fault is detected         PLC scan time fail (PLSF)       PLC scan time exceeds the maximum allowable       Action Time       Warning setting parameter       NA       Check for Source Code errors, if the exist, correct and download the program again.         PLC scan time exceeds the maximum allowable       Reset method       Check for programming errors, if they exist, correct and download the program again.       Check for source code errors, if the exist, correct and download the program again.         Reset condition       N/A       Reset condition       N/A         Reset condition       N/A       The 5V power that the drive provides to the communication       1) Make sure the communication well inserted and not loose.	
PLSF       60       PLC scan time fail (PLSF)       Action Level       When the PLC scan time exceeds the maximum allowable time (400 ms), the PLSF warning occurs.       Check for Source Code errors, if the exist, correct and download the programming errors, if they exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       Check for source Code errors, if the exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       Check for Source Code errors, if the exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       Check for Source Code errors, if the exist, correct and download the program again. If the fault does not exist, the warning automatically clears.         Reset condition       N/A       NA       Image: NA         Record       N/A       NA       Image: NA       Image: NA         Reset condition       N/A       NA       Image: NA       Image: NA         Reset condition       N/A       Image: NA       Image: NA       Image: NA         Reset condition       N/A       Image: NA       Image: NA       Image: NA         Reset condition       N/A       Image: NA       Image: NA       Image: NA         Reset condition       N/A       Image: NA       Image: NA       Image: NA         Reset condition       N/A       Image: NA       Image: NA       Image: NA	
PLSF       60       PLC scan time fail (PLSF)       Action Level       exceeds the maximum allowable time (400 ms), the PLSF warning occurs.       Immediately act when the fault is detected       Check for Source Code errors, if the exist, correct and download the programming errors, if they exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       Check for Source Code errors, if the exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       Check for Source Code errors, if the exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       Check for Source Code errors, if the exist, correct and download the program again. If the fault does not exist, the warning automatically clears.         Reset condition       N/A       N/A       Immediately act when the drive provides to the communication well inserted and not loose.	
PLSF       60       Action time tail (PLSF)       Action time       is detected       Check for Source Code errors, if the exist, correct and download the programming errors, if they exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       Check for programming errors, if they exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       Check for programming errors, if they exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       Check for programming errors, if they exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       Check for programming errors, if they exist, correct and download the program again. If the fault does not exist, the warning automatically clears.         Reset condition       N/A       Record       N/A         The 5V power that the drive provides to the communication       1) Make sure the communication well inserted and not loose.	
PLSF       60       PLC scan time exceeds the maximum allowable time       Warning setting parameter       NA       Check for Source Code errors, if the exist, correct and download the program again.         Reset method       Check for programming errors, if they exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       Action Level       NA       PLC scan time exceeds the maximum allowable errors, if they exist, correct and download the program again.       Action Level       The 5V power that the drive provides to the communication well inserted and not loose.	
PLC scar time exceeds the maximum allowable time       Check for programming errors, if they exist, correct and download the program again. If the fault does not exist, the warning automatically clears.       again.         Reset condition       N/A         Record       N/A         The 5V power that the drive provides to the communication well inserted and not loose.       1) Make sure the communication well inserted and not loose.	ogram
Reset condition       N/A         Record       N/A         The 5V power that the drive provides to the communication       1) Make sure the communication well inserted and not loose.	
The 5V power that the drive         1) Make sure the communication           Action Level         provides to the communication         1) Make sure the communication	
Action Level provides to the communication well inserted and not loose.	
ExCom power loss (ECLv)     Action Time     Immediately act     with another GS20 drive to che the ECLv warning still occurs. If replace with a new communica	f yes,
Low voltage of the Reset method Cycle the power card; if not, replace the drive.	
communication card Reset condition N/A 3) Use another communication card test if the ECLv warning still oct on the same drive. If not, replace the drive.	curs
Action Level The communication card is in the test mode	
ExCom test mode (ECtt) ExCom test mode (ECtt) Action Time Immediately act Warning setting parameter N/A Cycle the power	
card is in the test mode Reset method Cycle the power and enter the normal mode	
Reset condition     N/A       Record     N/A	
Action Level Factory default setting error	
ExCom factory defect Action Time Immediately act	
EEFF 75 (ECFF) Warning setting parameter N/A Use GSoft2 to download a new parameter set into the drive.	
Factory default setting error Reset condition N/A Record N/A	
(continued next page)	

D: /			vvurnung	Codes (continued)	
Display on GS20(X) Keypad	ID No.	Warning Name and Description	Action and Res	et	Corrective Action
			Action Level Action Time	Internal memory saving error Immediately act	1) Verify the wiring of the control circuit, and the wiring/grounding
	76	ExCom inner error (ECiF)	Warning setting parameter	N/A	of the main circuit to prevent interference.
EE ıF	76		Reset method	Cycle the power	2) Cycle the power.
		Serious internal error	Reset condition	N/A	3) Reset to the default value and check
			Record	N/A	if the error still exists. If yes, replace the communication card.
			Action Level	Hardware detection	
		Ethernet link fail (ECEF)	Action Time	Immediately act	
ECEF	80		Warning setting parameter	N/A	1) Re-connect the cable
		The Ethernet cable is not connected	Reset method	Manual reset	2) Replace the cable
		not connected	Reset condition	N/A	_
			Record	N/A	
			Action Level	Software detection	_
		Checksum error (ECCS)	Action Time	N/A	
EEES	82	communication card	Warning setting parameter	N/A	Verify the wiring of the control circuit, and the wiring/grounding of the main
			Reset method	Manual reset	circuit to prevent interference.
		and the drive	Reset condition	Immediately reset	_
			Record	N/A	
EErF 83		Return defect (ECrF) 83 Communication card returns to the default setting	Action Level	Communication card returns to the default setting	
	83		Action Time	N/A	_
			Warning setting parameter	N/A	No actions required.
			Reset method	Manual reset	]
			Reset condition	Immediately reset	_
			Record	N/A	
	84		Action Level	Hardware detection	<ol> <li>Verify the Master communication value does not exceed the allowabl number of communication cards.</li> </ol>
ECoD			Action Time	Immediately act	<ul> <li>If it does, decrease the Master communication value.</li> <li>2) Check if the connection is occupied</li> </ul>
		Modbus TCP over (ECo0)	Warning setting parameter	N/A	due to not disconnecting the Modbus TCP while the upper unit is connected without communicating it is, revise the program of the upper
		Modbus TCP exceeds the maximum communication value	Reset method	Manual reset	unit to disconnect the connection while the communication is not use for a long time.
			Reset condition	Immediately reset	<ol> <li>Check if a new Modbus TCP connection is built whenever the upper unit is connected to the communication card. If so, revise th program of the upper unit to use</li> </ol>
			Record	N/A	the same Modbus TCP connection when connecting to the same communication card.

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			Warning	Codes (continued)	
Display on GS20(X) Keypad	ID No.	Warning Name and Description	Action and Res	et	Corrective Action
			Action Level	Hardware detection	<ol> <li>Verify the Master communication value does not exceed the allowable number of communication cards.</li> </ol>
			Action Time	Immediately act	<ul><li>If it does, decrease the Master communication value.</li><li>2) Check if the connection is occupied</li></ul>
EEo I 85	EtherNet/IP over (ECo1) EtherNet/IP exceeds	Warning setting parameter	N/A	due to not disconnecting the Modbus TCP while the upper unit is connected without communicating. If it is, revise the program of the upper unit to disconnect the connection	
		the maximum communication value	Reset method	Manual reset	<ul><li>while the communication is not used for a long time.</li><li>3) Check if a new Modbus TCP connection is built whenever the</li></ul>
			Reset condition	Immediately reset	upper unit is connected to the communication card. If so, revise the program of the upper unit to use
			Record	N/A	the same Modbus TCP connection when connecting to the same communication card.
			Action Level	Software detection	
			Action Time	Immediately act	
EC iP	86	IP fail (ECiP)	Warning setting parameter	N/A	<ol> <li>Reset IP</li> <li>Contact MIS to check if DHCP Server</li> </ol>
		IP setting error	Reset method	Manual reset	works normally
			Reset condition Record	Immediately reset N/A	
			Action Level	Software detection	
		ExCom busy (ECbY)	Action Time	N/A	-
ЕСЬЧ 88		Communication card	Warning setting		-
	88		parameter	N/A	Decrease communication packets
			Reset method	Manual reset	
			Reset condition	N/A	_
			Record	N/A	
			Action Level	Communication card break off	-
		ExCom card break	Action Time Warning setting	N/A	
ЕССР 89		(ECCb)	parameter	N/A	
	89	(2000)		Auto-resets after the	Re-install the communication card
		Communication card break off warning	Reset method	communication card is re- installed	
			Reset condition	Immediately reset	
			Record	N/A	
		Copy PLC: password	Action Level	PLC password is incorrect	1
		error (CPLP)	Action Time	Immediately act	-
			Warning setting	N/A	
EPLP	00	Copy PLC password	parameter		Reset and enter the correct PLC
	90	90 error. When PLC copy is processing and the PLC password is incorrect, the CPLP warning	Reset method	Manual reset	password
			Reset condition	Directly reset	
		occurs.	Record	N/A	
			Action Level	Incorrect process when copying the PLC read mode	
		Copy PLC: Read mode	Action Time	Immediately act	]
CPLO	91	error (CPL0)	Warning setting	N/A	Cycle the power and copy the PLC read
	91	Copy PLC read mode	parameter	-	mode again
		error	Reset method	Manual reset	-
			Reset condition		4
			Record	N/A	
			(contii	nued next page)	

			warning	Codes (continued)	
Display on GS20(X) Keypad	ID No.	Warning Name and Description	Action and Rese		Corrective Action
		Conv DI C. Write mode		Incorrect process when copying the PLC write mode	
		Copy PLC: Write mode		Immediately act	
EPL I	92	(CPL1)	VA/	N/A	Cycle the power and copy the PLC write mode again
		Copy PLC write mode		Manual reset	
		error		Directly reset	
				N/A	
		Copy PLC: version error	Action Level	Software detection	
		(CPLv)		Immediately act	
[PLu	93	Copy PLC version error. When a non-GS20(X)	Warning cotting	N/A	Check if the copied PLC program is for GS20(X). If not, use the correct GS20(X)
		built-in PLC is copied to	Reset method	Manual reset	PLC program.
		the GS20(X) drive, the		Directly reset	1
		CPLv warning occurs.		N/A	-
	CFEV Warning Occurs.		Software detection		
		Copy PLC: size error (CPLS) Copy PLC capacity error		Immediately act	-
CPLS	94			N/A	Check if the copied PLC program is for GS20(X). Use the correct capacity for the
	54			Manual reset	GS20(X) PLC program.
[ <i>P</i> L <i>F</i> 95			Reset condition	Directly reset	
				N/A	-
				Software detection	
		Copy PLC: PLC function		Immediately act	-
		(CPLF)	Marning cotting		-
	95	Copy PLC function must	parameter	N/A	Disable the PLC function first, and then
	35			Manual reset	run the PLC copy function again.
		be executed when PLC		Directly reset	-
		is disabled.		N/A	
			Software detection		
EPLE 96		96 Copy PLC: time-out (CPLt) Copy PLC time-out		Immediately act	-
			Marning cotting		The GS20-KPD cannot be removed during the PLC copy process
	96		parameter	N/A	
	90			Manual reset	
				Directly reset	
				N/A	
				When P09.31= (-1) – (-10)	
<b>101</b>				(no -9) and the internal	1) Verify the wiring and grounding of
				communication between	
				Master and Slave is abnormal,	the communication circuit. Separate the communication circuit from the main circuit, or wire in 90 degree for effective anti-interference
		InrCOM time-out (ictn)		the ictn warning occurs.	
	101			Immediately act	
		Internal communication	Warning setting	N/A	performance.
וכבח		time-out	parameter	-	2) Check if the setting for P09.04 is the
וכבח				Auto-reset	same as the setting for the upper
וכבח		time-out			
וכבח		time-out		The warning automatically	unit
וכבח		ume-out	Reset condition		unit

## FAULT CODES

The GS20(X) drive has a comprehensive fault diagnostic system that include a variety of fault messages. When a fault is detected, the GS20(X) drive will shut down in order to protect internal components. The following faults are displayed as shown on the GS20(X) digital keypad display.

For communication errors, "Upper unit" is referring to the Master controller of the serial network. Always ensure the communication settings of the drive (P09.01 and P09.04) match those of the master controller and network.



Gaps in the fault ID numbers below are set aside as "reserved" faults for possible future use. Should your GS20(X) drive <u>repeatedly</u> display a reserved fault, please note the fault ID number and contact AutomationDirect technical support.

<ul> <li>a d) Set over-current stall prevention function (P06.03) <ul> <li>e) Replace the drive with a larger capacity model.</li> <li>2) Check the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.</li> <li>3) Check the motor insulation value with megger. Replace the motor if the insulation is poor.</li> <li>4) Check if the output current during the whole working process exceed three times of the rated current during acceleration.</li> <li>5) Reduce the load or increase the capacity of AC motor drive.</li> <li>6) Check the motor capacity (the rated current on the motor's nameplate should ≤ the rated current of the drive).</li> <li>7) Check the action timing of the contactor and make sure it is not turned ON/OFF when the drive outputs the voltage.</li> <li>8) Adjust the V/F curve setting and frequency/voltage. When the fault</li> </ul> </li> </ul>				I	Fault Codes
Immediately act         Fault setting parameter       N/A         Reset method       Manual reset         Reset method       Manual reset         Reset method       Reset in five seconds after the fault is cleared         Record       Yes         1       Cover-current during acceleration (ocA)         Output current exceeds three times of the rated current during acceleration.       Output current exceeds three times of the rated current during acceleration.         When ocA occurs, the drive closes the gate of the output immediately, the motor runs freely, and the display shows       Corrective Actions	GS20(X)	ID No.		Action, Reset, o	
<ul> <li>9) Adjust the torque compensation (refer to P07.26 torque compensation gain) until the output current reduces and the motor does not stall.</li> <li>10) Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.</li> <li>11) Enable speed tracking during start-up of P07.12.</li> <li>12) Correct the parameter settings for speed tracking. <ul> <li>a) Start the speed tracking function.</li> <li>b) Adjust the maximum current for P07.09 speed tracking.</li> <li>13) Check the settings for P00.11 control mode: <ul> <li>a) For IM, P00.11=0, 1, 2, 5</li> <li>b) For PM, P00.11=2</li> </ul> </li> <li>14) Increase the AC motor drive's capacity.</li> </ul></li></ul>		1	acceleration (ocA) Output current exceeds three times of the rated current during acceleration. When ocA occurs, the drive closes the gate of the output immediately, the motor runs freely, and the display shows	Action Time Fault setting parameter Reset method Reset condition Record	Immediately act         N/A         Manual reset         Reset in five seconds after the fault is cleared         Yes         1) Check acceleration time. If too short: <ul> <li>a) Increase the acceleration time of S-curve</li> <li>c) Set auto-acceleration and auto-deceleration parameter (P01.44)</li> <li>d) Set over-current stall prevention function (P06.03)</li> <li>e) Replace the drive with a larger capacity model.</li> </ul> <li>Check the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.</li> <li>Check the motor insulation value with megger. Replace the motor if the insulation is poor.</li> <li>Check if the output current during the whole working process exceed the AC motor drive's rated current. If yes, replace the AC motor drive with a larger capacity model.</li> <li>Reduce the load or increase the capacity of AC motor drive.</li> <li>Check the motor capacity (the rated current on the motor's nameplate should ≤ the rated current of the drive).</li> <li>Check the action timing of the contactor and make sure it is not turned ON/OFF when the drive outputs the voltage.</li> <li>Adjust the V/F curve setting and frequency/voltage. When the fault occurs, and the frequency voltage is too high, reduce the voltage.</li> <li>Adjust the torque compensation (refer to P07.26 torque compensation gain) until the output current reduces and the motor does not stall.</li> <li>Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.</li> <li>Enable speed tracking during start-up of P07.12.</li> <li>Correct the parameter settings for speed tracking.</li> <li>Start the speed tracking function.</li> <li>Adjust the maximum current for P07.09</li>

GS20(y)       ID No.       Puller Value and Description       Action, Reset, and Corrective Action         BCC       I       ocA (continued)       Is in the case of hardware failure, the ocA occurs due to the short circuit or ground fault at the output side of the drive. a) Check for possible short circuits between terminals with the electric meter:         I       ocA (continued)       Corrective Actions (contd)       Is in the case of hardware failure, the ocA occurs due to the short circuit or ground fault at the output side of the drive. a) Check for possible short circuit doe of the drive. a) Check for possible short circuit doe of the drive. b) Is corresponds to U, V and W. corresponds to U, V and Weine an parameter (P01.44) corresponds to U, V and Weine and correct the order correspond to correct the deceleration time of 5-curve corresponds to U, V and weing process exceed the AC motor drives and the uncert of the active. Check the motor insign the uncert on the motor insign theorect corresponds to U, V and Weine output ci				Fault C	odes (continued)
Ocr       1       ocA (continued)       Corrective Actions (control or ground fault at the output side of the drive.       a) Check for possible short circuit spetween terminals with the electric meter.         b) B1 corresponds to U, V and W, DC- corresponds to U, V and W, Corresponds to U, V and W, DC- corresponds to U, V and W, Corresponds to U, V and W, DC- corresponds to U, V and W, Corresponds to U, V and W, DC- corresponds to U, V and W, Corresponds to U, V and W, DC- corresponds to U, V and W, Corresponds to U, V and W, DC- corresponds to U, V and W, Corresponds to U, V and W, DC- corresponds to U, V and W, Corresponds to U, V and W, DC- corresponds to U, V and W, Corresponds to U, V and W, DC- corresponds to U, V and W, Corresponds to U, V and W, DC- corresponds to U, V and W, Corresponds to U, V and W, DC- corresponds to U, V and W, Corresponds to U, V and W, DC- corresponds to U, V and W, Corresponds to U, V and W, DC- corresponds to U, V and W, Corrective Static Corrective Reset method         Action Level Beest method deceleration (cod)       N/A         Over-current during deceleration (cod)       N/A         Output current exceeds three times of the rated current during deceleration (cod)       N/A         Output current exceeds three times of the rated current during deceleration (cod)       N/A         Output current exceeds three times of the rated current during deceleration (cod)       N/A         Output current exceeds three time thing the rated current during of the contact and nearchives to early.       Corrective the insulation is poor.         Output current exceeds three the output immediately.       Corrective the rated current during of the contact and		ID No.		Action, Reset, c	and Corrective Action
ocd       2         Action Time       Immediately act         Fault setting       N/A         Reset condition       Reset in five seconds after the fault is cleared         Reset condition       Reset in five seconds after the fault is cleared         Record       Yes         1)       Check if the deceleration time of 5-curve         c)       Set out-acceleration and auto-deceleration (P06.03)         e)       Increase the deceleration time of 5-curve         c)       Set outo-acceleration and auto-deceleration (P06.03)         e)       Replace the dive with a larger capacity model         2)       Check the motor cable and remover causes of any short circuits, or replace the cable before turining on the power.         3)       Check the motor current during the whole working process exceed the Cause to drive sit ated current during the whole working process exceed the AC motor drive's rated current. If yes, replace the AC motor drive with a larger capacity indel.         c)       Check the insulation value with weight whole working process exceed the cable before turing on the power.         4)       Corrective         Actions       Corrective         Actions       Corrective         Actions an ocd error.       Corrective         Actions an ocd error.       Corrective         Actins an ocd error.       Corrective	осЯ	1	ocA (continued)		<ul> <li>or ground fault at the output side of the drive.</li> <li>a) Check for possible short circuits between terminals with the electric meter:</li> <li>b) B1 corresponds to U, V and W; DC- corresponds to U, V and W; corresponds to U, V and W.</li> <li>c) If short circuit occurs, contact AutomationDirect Technical Support.</li> <li>17) Check the stall prevention setting and set the stall prevention to the</li> </ul>
Over-current during deceleration (ord)       N/A         Manual reset       Reset method         Manual reset       Reset in five seconds after the fault is cleared         Record       Yes         I       Check if the deceleration time is too short. If so: <ul> <li>a) Increase the deceleration time</li> <li>b) Increase the deceleration time</li> <li>b) Increase the deceleration method to the other activates too early.</li> <li>Check if the methor activates too early.</li> <li>Check if the methor activates too early.</li> <li>Check if the methor activates too early.</li> <li>Check if the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.</li> <li>Check if the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.</li> <li>Check if the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.</li> <li>Check if the output current during the whole working process exceed the AC motor drive's rated current. If yes, replace the AC motor drive with a larger capacity model.</li> <li>Check if the output current during the whole working process exceed the AC motor drive's rated current of the drive.</li> <li>If using an ON/OFF controller at the (U/V/W) drive output, check the action timing of the contact and make sure it is not turned ON/OFF whole as needed.</li> <li>When ocd error.</li> </ul> II wing an only OFF controller at the (U/V/W) drive output current reduces and the motor cable. If it is too long, increase the AC motor drive's capacity or install AC reactor(s) on the output side (U/V/W).				Action Level	
ocd       2       parameter       WA         Reset condition       Reset in five seconds after the fault is cleared         Record       Yes         Image: Condition       Reset condition         Reset condition       Reset condition         Reset condition       Reset condition         Record       Yes         Image: Condition       Reset condition         Reset conditin the condition       Reset condition<					Immediately act
Over-current during deceleration (arrest) <ul> <li>Reset method</li> <li>Manual reset</li> <li>Reset condition</li> <li>Reset in five seconds after the fault is cleared</li> <li>Record</li> <li>Yes</li> </ul> Over-current during deceleration time is too short. If so: <ul> <li>a) Increase the deceleration time of S-curve</li> <li>c) Set auto-acceleration and auto-deceleration parameter (P01.44)</li> <li>d) Set over-current shall prevention function (P06.03)</li> <li>e) Replace the drive with a larger capacity model</li> <li>Check if the mechanical brake of the motor activates too early.</li> <li>Check the motor insulation value with megger. Replace the motor if the insulation is poor.</li> <li>Check the motor capacity model.</li> <li>Check the impulsive change of the load and reduce the load or increase the capacity of AC motor drives a needed.</li> <li>Verify the motor capacity, model.</li> <li>Check the impulsive change of the load and reduce the load or increase the capacity of AC motor drives a needed.</li> <li>Verify the motor capacity. The rated current of the drive.</li> <li>Verify the motor capacity. The rated current of the drive.</li> <li>Horing as the drive capacity or AC motor drive as needed.</li> <li>Verify the motor capacity model.</li> <li>Verify the motor capacity of the output set the toulty.</li> <li>Mainte alter capacity of AC motor drive as needed.</li> <li>Verify the motor capacity or model.</li> <li>Verify the motor capacity or the drive.</li> <li>Horing as an ocd error.</li> <li>Verify the motor capacity or model is not turuned ON/OFF when the drive.</li></ul>				-	N/A
Over-current during deceleration (ocd)       Reset in five seconds after the fault is cleared         Ves       1       Check if the deceleration time is too short. If so: <ul> <li>a) Increase the deceleration time of S-curve</li> <li>c) Set auto-acceleration and auto-deceleration parameter (P01.44)</li> <li>d) Set over-current stall prevention function (P06.03)</li> <li>e) Replace the drive with a larger capacity model</li> </ul> Over-current during deceleration (ocd)         OLeck the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.           Output current exceeds three times of the rated current during deceleration.           When ocd occurs, the drive closes the gate of the output timmediately, the motor capacity of AC motor drive and the display shows an ocd error.         Corrective           Actions an ocd error.         Actions an ocd error.         Si f using an ON/OFF controller at the drive.           If using an ON/OFF controller at the drive.         Actions an ocd error.         Adjust the V/F curve settings and frequency/voltage. When the failut occurs, and the requery voltage is too high, reduce the voltage.           Image: Action of the main circuit to prevent interference.         Adjust the V/F curve settings and frequency/voltage. When the failut or ground fault at the output side of the drive.           Image: Action of the main circuit to prevent interference.         Check the ropscible short circuits between terminals with the electric meter.           Image: Action of the output side of th					
Image: Construct of the second in the sec					
<ul> <li>Check if the deceleration time is too short. If so:         <ul> <li>a) Increase the deceleration time</li> <li>b) Increase the deceleration time of 5-curve</li> <li>c) Set auto-acceleration and auto-deceleration (P60.03)</li> <li>e) Replace the drive with a larger capacity model</li> <li>2) Check if the mechanical brake of the motor activates too early.</li> <li>3) Check the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.</li> <li>4) Check the motor rable and remove causes of any short circuits, or replace the cable before turning on the power.</li> <li>4) Check the motor rable and remove causes of any short circuits, or replace the cable before turning on the power.</li> <li>4) Check the motor rable and remove causes of any short circuits, or replace the cable before turning on the power.</li> <li>4) Check the motor rable and remove causes of any short circuits, or replace the cable before turning on the power.</li> <li>5) Check if the output current during the whole working process exceed the AC motor drive's rated current of the AC motor drive is rated current of the AC motor drive's rated current on the motor's nameplate should ≤ the rated current of the drive.</li> <li>6) Check the impulsive change of the load and reduce the load or increase the capacity of AC motor drive as needed.</li> <li>7) Verify the motor capacity, the rated current on the motor's nameplate should ≤ the rated current of the drive.</li> <li>8) If using an ON/OFF controller at the (U/V/W) drive output, check the action timing of the contractor and make sure it is not turned ON/OFF when the drive outputs is the voltage.</li> <li>9) Adjust the V/F curve settings and frequency/voltage. When the fault occurs, and the frequency voltage is too high, reduce the voltage.</li> <li>10) Adj</li></ul></li></ul>					
Support. 14) Verify the stall prevention setting and set the stall prevention to the proper value.	ocd	2	deceleration (ocd) Output current exceeds three times of the rated current during deceleration. When ocd occurs, the drive closes the gate of the output immediately, the motor runs freely, and the display shows	Corrective Actions	<ol> <li>Check if the deceleration time is too short. If so:         <ul> <li>a) Increase the deceleration time of S-curve</li> <li>c) Set auto-acceleration and auto-deceleration parameter (P01.44)</li> <li>d) Set over-current stall prevention function (P06.03)</li> <li>e) Replace the drive with a larger capacity model</li> </ul> </li> <li>Check if the mechanical brake of the motor activates too early.</li> <li>Check the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.</li> <li>Check the motor insulation value with megger. Replace the motor if the insulation is poor.</li> <li>Check if the output current during the whole working process exceeds the AC motor drive's rated current. If yes, replace the AC motor drive with a larger capacity model.</li> <li>Check the impulsive change of the load and reduce the load or increase the capacity model.</li> <li>Check the motor capacity, the rated current on the motor's nameplate should ≤ the rated current of the drive.</li> <li>If using an ON/OFF controller at the (U/V/W) drive output, check the action timing of the contactor and make sure it is not turned ON/OFF when the drive outputs the voltage.</li> <li>Adjust the V/F curve settings and frequency/voltage. When the fault occurs, and the frequency voltage is too high, reduce the voltage.</li> <li>Adjust the P07.26 torque compensation gain until the output current reduces and the motor does not stall.</li> <li>Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.</li> <li>Check the length of the motor cable. If it is too long, increase the AC motor drive's capacity or install AC reactor(s) on the output side (U/V/W).</li> <li>In the case of a hardware error, the ocd occurs due to the short circuit or ground fault at the output side of the drive.</li> <li>Check the length of the motor cable. If it i</li></ol>
				(contir	nued next page)

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			Fault C	Codes (continued)
Display on GS20(X) Keypad	ID No.	Fault Name and Description	Action, Reset, o	and Corrective Action
Поурии			Action Level Action Time	300% of the rated current Immediately act
			Fault setting parameter	N/A
			Reset method	Manual reset
			Reset condition Record	Reset in five seconds after the fault is cleared Yes
פבח	3	Over-current during steady operation (ocn) Output current exceeds three times of the rated current during constant speed. When ocn occurs, the drive closes the gate of the output immediately, the motor runs freely, and the display shows an ocn error.	Corrective Actions	<ol> <li>Check the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.</li> <li>Check for possible shaft lock, burnout or aging insulation of the motor.         <ul> <li>a) Check the motor insulation value with megger. Replace the motor if the insulation is poor.</li> </ul> </li> <li>Check for impulsive change of the load, and reduce the load or increase the capacity of AC motor drive.</li> <li>Check motor capacity (the rated current on the motor's nameplate should ≤ the rated current of the drive)</li> <li>If using an ON/OFF controller at the drive output, check the action timing of the contactor and make sure it is not turned ON/OFF when the drive outputs the voltage.</li> <li>Adjust the V/F curve settings and frequency/voltage. When the fault occurs, and the frequency voltage is too high, reduce the voltage.</li> <li>Adjust P07.26 torque compensation gain until the output current reduces and the motor does not stall.</li> <li>Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.</li> <li>Check the length of the motor cable. If too long:         <ul> <li>a) Increase the AC motor drive's capacity.</li> <li>b) Install AC reactor(s) on the output side of the drive.</li> <li>a) Check for possible short circuit between terminals with the electric meter:</li> <li>b) B1 corresponds to U, V and W; DC- corresponds to U, V, and W; corresponds to U, V, and W.</li> <li>c) If short circuits occurs, contact AutomationDirect Technical Support.</li> </ul> </li> </ol>
			Action Level	N/A
			Action Time Fault setting	N/A
			parameter	N/A
			Reset method	Manual reset
		Ground fault (GFF)		
9FF	4	When the drive detects grounding short circuit on the output terminals (U/V/W), the drive closes the gate of the output immediately, the motor runs freely, and the display shows a GFF error.	Record Corrective Actions	<ol> <li>Yes</li> <li>Check for motor burnout or aging insulation.         <ul> <li>a) Check the motor insulation value with megger.</li> <li>b) Replace the motor if the insulation is poor.</li> </ul> </li> <li>Check the cable for short circuits and replace the cable if needed.</li> <li>If the motor cable length exceeds 100 m, decrease the setting value for the carrier frequency and take remedies to reduce stray capacitance.</li> <li>Verify the grounding and wiring of the communication circuit. Separate the communication circuit from the main circuit, or wire in 90 degree for effective anti-interference performance.</li> </ol>
			(conti	<ul> <li>5) Cycle the power after checking the status of motor, cable, and cable length. If GFF still exists, contact AutomationDirect Technical Support.</li> <li>6) Refer to the corrective actions for ocn.</li> <li>7) Refer to the corrective actions for ocA.</li> <li>8) Refer to the corrective actions for ocd.</li> <li>mued next page)</li> </ul>

		Fault C	Codes (continued)
ID No.	Fault Name and Description	Action, Reset, o	and Corrective Action
	Over-current at stop	Action Level	300% of the rated current
	(ocS)	Action Time	Immediately act
	Over-current or	Fault setting parameter	N/A
		Reset method	Manual reset
6			Reset in five seconds after the fault is cleared
	Cycle the power after ocS occurs. If the hardware failure occurs, the display shows cd1, cd2 or cd3.	Corrective Actions	<ol> <li>Yes</li> <li>Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.</li> <li>Check if other error codes such as cd1–cd3 occur after cycling the power. If yes, return to the factory for repair.</li> </ol>
		Action Level	120V/230V series: 410VDC 460V series: 820VDC 575V series: 1116VDC
	Over-voltage during acceleration (ovA) DC bus over-voltage during acceleration. When ovA occurs, the drive closes the gate of the output, the motor runs freely, and the display shows an ovA error.	Action Time	Immediately act when the DC bus voltage is higher than the level
		Fault setting	N/A
		parameter	
		Reset method	Manual reset
		Reset condition	Reset only when the DC bus voltage is lower than 90% of the over- voltage level
		Record	Yes
7		Corrective Actions	<ol> <li>Check acceleration. If too slow:         <ul> <li>a) Decrease the acceleration time</li> <li>b) Use a braking unit or DC bus</li> <li>c) Replace the drive with a larger capacity model.</li> </ul> </li> <li>Check the setting for stall prevention level. If the value is lower than no-load current, adjust it to be higher than no-load current.</li> <li>Check if the input voltage is within the rated AC motor drive input voltage range, and check for possible voltage spikes.</li> <li>If the phase-in capacitor or active power supply unit acts in the same power system, the input voltage may surge abnormally in a short time. In this case, install an AC reactor.</li> <li>Check for regenerative voltage of motor inertia. If regenerative voltage is being generated:         <ul> <li>a) Use over-voltage stall prevention function (P06.01)</li> <li>b) Use auto-acceleration and auto-deceleration setting (P01.44)</li> <li>c) Use a braking unit or DC bus</li> </ul> </li> <li>Check if the over-voltage Fault occurs after acceleration stops, which indicates acceleration time is too short. Do the following:         <ul> <li>a) Increase the acceleration time</li> <li>b) Set P06.01 over-voltage stall prevention</li> <li>c) Increase the setting value for P01.25 S-curve acceleration arrival time 2</li> </ul> </li> <li>The ground short circuit current charges the capacitor in the main circuit through the power. Check if there is a ground fault on the motor cable, wiring box, or its internal terminals.</li> <li>If using a braking resistor or brake unit, check the wiring.</li> <li>Verify the wiring of the control circuit and the wiring/grounding of</li> </ol>
	6	ID No.       Description         Over-current at stop (ocS)       Over-current or hardware failure in current detection at stop.         Cycle the power after ocS occurs. If the hardware failure occurs, the display shows cd1, cd2 or cd3.         Over-voltage during acceleration (ovA)         DC bus over-voltage during acceleration. When ovA occurs, the drive closes the gate of the output, the motor runs freely, and the display shows an ovA	ID No.Fault Name and DescriptionAction, Reset, of Action Level Action Time Fault setting parameter Reset method Record6Over-current or hardware failure in current detection at stop. Cycle the power after ocS occurs. If the hardware failure occurs, the display shows cd1, cd2 or cd3.Action Level Action Time Fault setting parameter Reset method Record7Over-voltage during acceleration (ovA)Action Time Fault setting parameter Reset method Record7Over-voltage during acceleration (ovA)Action Level Action Time Fault setting parameter Reset method Reset condition Record7Over-voltage during acceleration (ovA)Record7Over-voltage during acceleration, When ovA occurs, the drive closes the gate of the output, the motor runs freely, and the display shows an ovA errorCorrective

Display on			Fault C	Codes (continued)
	ID No.	Fault Name and Description	Action, Reset, o	and Corrective Action
oud	8	Over-voltage during deceleration (ovd) DC bus over-voltage during deceleration. When ovd occurs, the drive closes the gate of the output immediately, the motor runs freely, and the display shows an ovd error.	Action Level Action Time Fault setting parameter Reset method Reset condition Record Corrective Actions	<ul> <li>120V/230V series: 410VDC</li> <li>460V series: 820VDC</li> <li>575V series: 1116VDC</li> <li>Immediately act when the DC bus voltage is higher than the level</li> <li>N/A</li> <li>Manual reset</li> <li>Reset only when the DC bus voltage is lower than 90% of the over-voltage level</li> <li>Yes</li> <li>1) Deceleration time may be too short, resulting in too much regenerative energy. <ul> <li>a) Increase the setting value of P01.13, P01.15, P01.17 and P01.19 (deceleration time)</li> <li>b) Connect a braking resistor, braking unit or DC bus on the drive.</li> <li>c) Reduce the braking frequency.</li> <li>d) Replace the drive with a larger capacity model.</li> <li>e) Use S-curve acceleration/deceleration (P01.44).</li> <li>h) Adjust the braking level (P07.01 or the bolt position of the braking unit).</li> </ul> </li> <li>2) Verify that the setting for stall prevention level is larger than no-load current</li> <li>3) Check if the input voltage is within the rated AC motor drive input voltage range, and check for possible voltage spikes.</li> <li>4) If the phase-in capacitor or active power supply unit acts in the same power system, the input voltage may surge abnormally in a short time. In this case, install an AC reactor.</li> <li>5) The ground short circuit current charges the capacitor in the main circuit through the power. Check if there is ground fault on the moto cable, wiring box, or its internal terminals.</li> <li>6) If using a braking resistor or braking unit, check the wiring.</li> <li>7) Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interforence.</li> </ul>
סטח	9	Over-voltage during constant speed (ovn) DC bus over-voltage at constant speed. When ovn occurs, the drive closes the gate of the output immediately, the motor runs freely, and the display shows an ovn error.	Corrective Actions	<ul> <li>the main circuit to prevent interference.</li> <li>120V/230V series: 410VDC</li> <li>460V series: 820VDC</li> <li>575V series: 1116VDC</li> <li>Immediately act when the DC bus voltage is higher than the level</li> <li>N/A</li> <li>Manual reset</li> <li>Reset only when the DC bus voltage is lower than 90% of the over-voltage level</li> <li>Yes</li> <li>1) Check for impulsive change of the load, then do the following: <ul> <li>a) Connect a brake resistor, braking unit or DC bus to the drive.</li> <li>b) Reduce the load.</li> <li>c) Replace the drive with a larger capacity model.</li> <li>d) Adjust the braking level (P07.01 or bolt position of the brake unit).</li> </ul> </li> <li>2) Verify the stall prevention level setting is higher than no-load current 3) Check for regenerative voltage, then enable over-voltage stall prevention function (P06.01) or use a braking unit or DC bus</li> <li>4) Check if the input voltage is within the rated AC motor drive input voltage range, and check for possible voltage spikes.</li> <li>5) If the phase-in capacitor or active power supply unit acts in the same power system, the input voltage may surge abnormally in a short time. In this case, install an AC reactor.</li> <li>6) The ground short circuit current charges the capacitor in the main circuit through the power. Check if there is ground fault on the moto cable, wiring box, or its internal terminals.</li> <li>7) If using a braking resistor or braking unit, check the wiring.</li> <li>8) Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.</li> </ul>

Fault Codes (continued)					
Display on GS20(X) Keypad	ID No.	Fault Name and Description	Action, Reset, o	and Corrective Action	
Теурии			Action Level	120V/230V series: 410VDC 460V series: 820VDC 575V series: 1116VDC	
			Action Time	Immediately act when the DC bus voltage is higher than the level	
			Fault setting parameter	N/A	
			Reset method	Manual reset	
			Reset condition	Reset only when the DC bus voltage is lower than 90% of the over- voltage level	
		Over-voltage at stop	Record	Yes	
005	10	(ovS) Over-voltage at stop	Corrective Actions	<ol> <li>Check if the input voltage is within the rated AC motor drive input voltage range, and check for possible voltage spikes.</li> <li>If the phase-in capacitor or active power supply unit acts in the same power system, the input voltage may surge abnormally in a short time. In this case, install an AC reactor.</li> <li>The ground short circuit current charges the capacitor in the main circuit through the power. Check if there is ground fault on the motor cable, wiring box, or its internal terminals.</li> <li>If using a braking resistor or braking unit, check the wiring.</li> <li>Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.</li> <li>Check if other error codes such as cd1–cd3 occur after cycling the power. If yes, contact AutomationDirect Technical Support.</li> </ol>	
			Action Level	P06.00 (120V/230V series = 180VDC 460V series = 360VDC 575V series = 450VDC)	
			Action Time	Immediately act when the DC bus voltage is lower than P06.00	
			Fault setting	N/A	
			parameter Reset method	Manual reset	
		Low-voltage during acceleration (LvA) DC bus voltage is lower than P06.00 setting value during acceleration	Reset condition	Reset when the DC bus voltage is higher than P06.00 + 30 V	
LuA	11		Corrective Actions	<ul> <li>Yes</li> <li>1) Improve power supply condition.</li> <li>2) Adjust voltage to the power range of the drive</li> <li>3) Check the power system and increase the capacity of power equipment if needed.</li> <li>4) The load may be too heavy. If so: <ul> <li>a) Reduce the load.</li> <li>b) Increase the drive capacity.</li> <li>c) Increase the drive capacity.</li> <li>c) Increase the acceleration time.</li> </ul> </li> <li>5) Check the DC bus and install DC reactor (s).</li> <li>6) Check for a short circuit plate or DC reactor installed between terminal +1 and +2.</li> <li>7) If the error still exists, contact AutomationDirect Technical Support.</li> </ul>	
	12	Low-voltage during deceleration (Lvd) DC bus voltage is lower than P06.00 setting value during deceleration	Action Level	(120V/230V series = 180VDC 460V series = 360VDC 575V series = 450VDC) Immediately act when the DC bus voltage is lower than P06.00	
			Fault setting		
			parameter	N/A	
			Reset method Reset condition	Manual reset Reset when the DC bus voltage is higher than P06.00 + 30 V	
Lud			Record Corrective Actions	Yes 1) Improve power supply condition. 2) Adjust voltage to the power range of the drive 3) Check the power system and increase the capacity of power equipment if needed. 4) The fault may be triggered by sudden load. If so:	
				<ul><li>a) Reduce the load.</li><li>b) Increase the drive capacity.</li><li>5) Check the DC bus and install DC reactor(s).</li></ul>	
(continued next page)					

Fault Codes (continued)					
Display on GS20(X) Keypad	ID No.	Fault Name and Description	Action, Reset, o	and Corrective Action	
		Low-voltage at	Action Level	P06.00 (120V/230V series = 180VDC 460V series = 360VDC 575V series = 450VDC) Immediately act when the DC bus voltage is lower than P06.00	
			Fault setting parameter	N/A	
	10	constant speed (Lvn)	Reset method Reset condition	Manual reset Reset when the DC bus voltage is higher than P06.00 + 30 V	
Lun	13	DC bus voltage is lower	Record	Yes	
		than P06.00 setting value at constant speed	Corrective Actions	<ol> <li>Improve power supply condition.</li> <li>Adjust voltage to the power range of the drive</li> <li>Check the power system and increase the capacity of power equipment if needed.</li> <li>The fault may be triggered by sudden load. If so:         <ul> <li>a) Reduce the load.</li> <li>b) Increase the drive capacity.</li> </ul> </li> <li>Check the DC bus and install DC reactor(s).</li> </ol>	
			Action Level	P06.00 (120V/230V series = 180VDC 460V series = 360VDC 575V series = 450VDC)	
			Action Time	Immediately act when the DC bus voltage is lower than P06.00	
		Low-voltage at stop (LvS) DC bus voltage is lower than P06.00 setting value at stop or a hardware failure in voltage detection had occurred.	Fault setting parameter	N/A	
Lu5	14		Reset method	Manual / Auto: 120V/230V series: Lv level + 30VDC + 500ms 460V series: Lv level + 60VDC + 500ms 575V series: Lv level + 75VDC + 500ms	
			Reset condition	500 ms	
			Record Corrective Actions	<ol> <li>Yes</li> <li>Improve power supply condition.</li> <li>Check if the power specification matches the drive.</li> <li>Adjust voltage to the power range of the drive.</li> <li>Cycle the power after checking the power. If LvS error still exists, return to the factory for repair.</li> <li>Check the power system.</li> <li>Increase the capacity of power equipment.</li> <li>Install DC reactor(s).</li> </ol>	
		Phase loss protection (orP) Phase loss of power input	Action Level	When DC bus ripple is higher than the protection level, and the output current exceeds 50% of the rated current, the drive starts counting. When the counting value reaches the upper limit, an orP error occurs.	
	15		Action Time	The action time varies with different output current.	
			Fault setting parameter Reset method	P06.53 Manual reset	
			Reset condition	Immediately reset when DC bus is higher than P07.00	
			Record	Yes	
or P			Corrective Actions	<ol> <li>Yerify the wiring of the main circuit power is installed correctly.</li> <li>Check that a single-phase power supply is not being used with a three-phase model. Choose the model whose power matches the voltage.</li> <li>Power voltage changes can trigger this fault. If the main circuit power works normally, verify the main circuit. Cycle the power after checking the power, if orP error still exists, contact AutomationDirect Technical Support.</li> <li>Check for loose terminal wiring, tighten the terminal screws according to the torque described in the user manual.</li> <li>Verify the input cable is undamaged and replace if needed.</li> <li>Check for unbalanced three-phase input power.</li> </ol>	

Fault Codes (continued)					
Display on GS20(X) Keypad	ID No.	Fault Name and Description	Action, Reset, o	and Corrective Action	
∟H I	16	IGBT overheating (oH1) IGBT temperature exceeds the protection level. Protection level is model default of P06.15 + 5°C	Action Level Action Time Fault setting parameter Reset method Reset condition Record Corrective Actions	<ul> <li>Depending on the model power, model default of P06.15 +5°C.</li> <li>When the setting for P06.15 is higher than the oH1 level, oH1 error occurs instead of oH1 warning. An IGBT overheating error occurs, and the drive stops.</li> <li>Immediately when limit is reached.</li> <li>N/A</li> <li>Manual reset</li> <li>Reset only when IGBT temperature is lower than oH1 error level minus (-) 10°C</li> <li>Yes</li> <li>1) Check the ambient temperature.</li> <li>2) Regularly inspect the ventilation hole of the control cabinet.</li> <li>3) Change the installed location if there are heating objects, such as braking resistors, in the surroundings.</li> <li>4) Install/add cooling fan or air conditioner to lower the temperature inside the cabinet.</li> <li>5) Check for and remove obstructions or replace the cooling fan.</li> <li>6) Increase ventilation space of the drive.</li> <li>7) Decrease loading.</li> </ul>	
			Action Level	<ul> <li>8) Decrease the carrier wave.</li> <li>9) Replace the drive with higher capacity model.</li> <li>NTC broken or wiring failure</li> <li>When the IGBT temperature is higher than the protection level, and</li> </ul>	
£Н Io	18	IGBT temperature detection failure (tH1o) IGBT hardware failure in temperature detection	Fault setting parameter Reset method Reset condition Record Corrective	detection time exceeds 100 ms, the tH1o protection activates. N/A Manual reset Immediately reset Yes Wait for 10 minutes, and then cycle the power. Check if tH1o protection	
۲ ۵ ۵ ۲	Over load (oL) The AC motor drive detects excessive drive output current. Overload capacity: • Variable Torque (VT): Sustains for one	Actions Action Level Action Time Fault setting parameter Reset method Reset condition Record	still exists. If yes, contact AutomationDirect Technical Support. Based on overload curve and derating curve. When the load is higher than the protection level and exceeds allowable time, the oL protection activates. N/A Manual reset Reset in five seconds after the fault is cleared Yes		
	21	<ul> <li>minute when the drive outputs 120% of the drive's rated output current.</li> <li>Sustains for three seconds when the drive outputs 150% of the drive's rated output current.</li> <li>Constant Torque (CT): Sustains for one minute when the drive outputs 150% of the drive's rated output current.</li> <li>Sustains for three seconds when the drive outputs 200% of the drive's rated</li> </ul>	Corrective Actions	<ol> <li>Reduce the load.</li> <li>Increase the setting value for P01.12–P01.19 (accel./decel. time)</li> <li>Adjust the settings for P01.01–P01.08 (V/F curve), especially the setting value for the mid-point voltage (if the mid-point voltage is set too low, the load capacity decreases at low speed). Refer to the V/F curve selection of P01.43.</li> <li>Replace the drive with a larger capacity model.</li> <li>If the oL only occurs during low-speed operations:         <ul> <li>a) Reduce the load during low-speed operations:</li> <li>b) Increase the drive capacity.</li> <li>c) Decrease the carrier frequency of P00.17.</li> </ul> </li> <li>Adjust P07.26 Torque Compensation Gain until the output current reduces and the motor does not stall.</li> <li>Verify stall prevention is set to the proper value.</li> <li>Check the status of three-phase motor and verify the cable is not broken or screws are loose.</li> <li>Verify the parameter settings for speed tracking.         <ul> <li>a) Start the speed tracking function.</li> <li>b) Adjust the maximum current for P07.09 speed tracking.</li> </ul> </li> </ol>	
		output current.			

Fault Codes (continued)					
Display on GS20(X) Keypad	ID No.	Fault Name and Description	Action, Reset, o	and Corrective Action	
EoL I	22	Electronics thermal relay 1 protection (EoL1) Electronics thermal relay 1 protection. The drive coasts to stop once it activates.	Action Level Action Time Fault setting parameter Reset method Reset condition Record	<ul> <li>Start counting when the output current &gt; 150% of the motor 1 rated current</li> <li>P06.14 (If the output current is larger than 105% of the motor 1 rated current again within 60 sec., the counting time reduces and is less than P06.14)</li> <li>N/A</li> <li>Manual reset</li> <li>Reset in five seconds after the fault is cleared</li> <li>Yes</li> <li>1) Reduce the load.</li> <li>2) Increase the setting value for P01.12–P01.19 (accel./decel. time)</li> <li>3) Adjust the settings for P01.01–P01.08 (V/F curve), especially the setting value for the mid-point voltage (if the mid-point voltage is set too low, the load capacity decreases at low speed). Refer to the V/F curve selection of P01.43.</li> <li>4) If the EoL1 only occurs during low-speed operations: <ul> <li>a) Replaced the drive with a dedicated VFD model.</li> <li>b) Increase the motor capacity.</li> </ul> </li> <li>5) If using a VFD dedicated motor, verify P06.13=1: Standard motor (motor with fan on the shaft).</li> <li>6) Verify motor rated current and reset if needed.</li> <li>7) Verify motor rated frequency and reset if needed.</li> <li>8) If using one drive to run multiple motors, set P06.13=2: Disable, and install thermal relay on each motor.</li> <li>9) Set stall prevention to the proper value.</li> <li>10) Adjust P07.26 torque compensation gain until the current reduces and the motor does not stall.</li> <li>11) Check the status of the fan, or replace the fan.</li> <li>12) Replace the motor.</li> </ul>	
EoL 2	23	Electronic thermal relay 2 protection (EoL2) Electronic thermal relay 2 protection. The drive coasts to stop once it activates.	Action Level Action Time Fault setting parameter Reset method Reset condition Record	<ul> <li>Start counting when the output current &gt; 150% of the motor 2 rated current</li> <li>P06.28 (If the output current is larger than 105% of the motor 2 rated current again within 60 sec., the counting time reduces and is less than P06.28)</li> <li>N/A</li> <li>Manual reset</li> <li>Reset in five seconds after the fault is cleared</li> <li>Yes</li> <li>1) Reduce the load.</li> <li>2) Increase the setting value for P01.12–P01.19 (accel./decel. time)</li> <li>3) Adjust the settings for P01.35–P01.42 (V/F curve), especially the setting value for the mid-point voltage (if the mid-point voltage is set too low, the load capacity decreases at low speed). Refer to the V/F curve selection of P01.43.</li> <li>4) If the EoL2 only occurs during low-speed operations: <ul> <li>a) Replaced the drive with a dedicated VFD model.</li> <li>b) Increase the motor capacity.</li> </ul> </li> <li>5) If using a VFD dedicated motor, verify P06.27=1: Standard motor (motor with fan on the shaft).</li> <li>6) Verify motor rated current and reset if needed.</li> <li>7) Verify motor rated frequency and reset if needed.</li> <li>8) If using one drive to run multiple motors, set P06.27=2: Disable, and install thermal relay on each motor.</li> <li>9) Set stall prevention to the proper value.</li> <li>10) Adjust P07.71 torque compensation gain until the current reduces and the motor does not stall.</li> <li>11) Check the status of the fan, or replace the fan.</li> <li>12) Replace the motor.</li> </ul>	

	Fault Codes (continued)				
Display on GS20(X) Keypad	ID No.	Fault Name and Description		and Corrective Action	
			Action Level	PTC input value > P06.30 setting (Default = 50%)	
			Action Time	Immediately act	
				P06.29 setting is:	
			Fault setting	0: Warn and continue operation	
			parameter	1: Fault and ramp to stop	
			1	2: Fault and coast to stop	
				3: No warning	
			Reset method	When P06.29=0, oH3 is a "Warning". The "Warning" is automatically cleared.	
			Reset method		
			Reset condition	When P06.29=1 or 2, oH3 is a "Fault". You must reset manually. Immediately reset	
			Record	When P06.29=1 or 2, oH3 is a "Fault", and the fault is recorded.	
				1) Check if motor is locked and remove the motor shaft lock.	
				2) Verify load and decrease the loading or replace motor with a higher	
		Motor overheating		capacity model if load is too high.	
		(oH3) PTC		3) Verify ambient temperature and change the installation location if	
				there are heating devices in the surroundings, or install/add cooling	
		Motor overheating		fan or air conditioner to lower the ambient temperature.	
oH3		(PTC) (P03.00–P03.01=6		4) Check the cooling system and ensure it's working normally.	
0/10	_	PTC), when PTC		5) Verify the motor fan is working and replace the fan if needed.	
		input > P06.30, the		6) Verify duration of low speed operation.	
		fault treatment acts		a) Decrease low-speed operation time.	
		according to P06.29.		b) Change to dedicated motor for the drive.	
			Corrective Actions	c) Increase the motor capacity.	
				7) Verify accel/decel time and increase setting values for P01.12–P01.19	
				(accel./ decel. time) if working cycle is too short.	
				8) Verify V/F voltage and adjust settings for P01.01–P01.08 (V/F curve),	
				especially the setting value for the mid-point voltage (if the mid-poin	
				voltage is set too small, the load capacity decreases at low-speed).	
				9) Verify the motor rated current matches the motor nameplate and	
				configure the correct rated current value of the motor if needed.	
				10) Check the connection between PTC thermistor and the heat	
				protection. 11) Verify stall prevention is set correctly and adjust the value if needed.	
				12) Check for unbalanced three-phase motor impedance. Replace the	
				motor if needed.	
				13) Verify harmonics and reduce harmonics if too high.	
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Fault Codes (continued)           Display on         Fault Name and				
	ID No.	Fault Name and Description	Action, Reset, o	and Corrective Action
			Action Level	PT100 RTD input value > P06.57 setting (default = 7V)
			Action Time	Immediately act P06.29 setting is:
				0: Warn and continue operation
			Fault setting	1: Fault and ramp to stop
			parameter	2: Fault and coast to stop
				3: No warning
				When P06.29=0 and the temperature < P06.56, oH3 is automatically
			Reset method	cleared.
				When P06.29=1 or 2, oH3 is a "Fault". You must reset manually.
			Reset condition	Immediately reset
			Record	When P06.29=1 or 2, oH3 is a "Fault", and the fault is recorded. 1) Check if motor is locked and remove the motor shaft lock.
		Motor overheating		<ol> <li>Verify load and decrease the loading or replace motor with a higher</li> </ol>
		(oH3) PT100 RTD		capacity model if load is too high.
				3) Verify ambient temperature and change the installation location if
		Motor overheating		there are heating devices in the surroundings, or install/add cooling
	24.2	(PT100) (P03.00-		fan or air conditioner to lower the ambient temperature.
oH3	24_2	P03.01=11 PT100).		4) Check the cooling system and ensure it's working normally.
		When PT100 input >		5) Verify the motor fan is working and replace the fan if needed.
		P06.57 (default = 7V),		6) Verify duration of low speed operation.
		the fault treatment acts according to P06.29.		a) Decrease low-speed operation time.
			<i>c</i>	b) Change to dedicated motor for the drive.
			Corrective	c) Increase the motor capacity.
			Actions	<ul> <li>Verify accel/decel time and increase setting values for P01.12–P01.15 (accel./ decel. time) if working cycle is too short.</li> </ul>
				<ul> <li>8) Verify V/F voltage and adjust settings for P01.01–P01.08 (V/F curve),</li> </ul>
				especially the setting value for the mid-point voltage (if the mid-point
				voltage is set too small, the load capacity decreases at low-speed).
				<ul><li>9) Verify the motor rated current matches the motor nameplate and</li></ul>
				configure the correct rated current value of the motor if needed.
				10) Check the connection of PT100 RTD.
				11) Verify stall prevention is set correctly and adjust the value if needed.
				12) Check for unbalanced three-phase motor impedance. Replace the
				motor if needed.
				13) Verify harmonics and reduce harmonics if too high.
			Action Level Action Time	P06.07 P06.08
			Action fille	P06.06 setting is:
			Fault setting parameter	0: No function
	26	Over torque 1 (ot1) When the output current exceeds the over-torque detection level (P06.07) and exceeds over-torque detection time (P06.08), and when P06.06 or P06.09 is set to 2 or 4, the ot1 error displays.		1: Continue operation after over-torque detection during constant speed
				operation
				2: Stop after over-torque detection during constant speed operation
				3: Continue operation after over-torque detection during RUN
				4: Stop after over-torque detection during RUN
				When P06.06=1 or 3, ot1 is a "Warning". The warning is automatically
			Reset method	cleared when the output current < (Pr.06-07 – 5%) When P06.06=2 or 4, ot1 is a "Fault". You must reset manually.
			Reset condition	Immediately reset
			Record	When P06.06=2 or 4, ot1 is a "Fault", and the fault is recorded.
ot 1				1) Verify the settings for P06.07 and P06.08.
				2) Check for mechanical failure and remove any causes of malfunction.
				3) Reduce the load or replace the motor with a higher capacity model.
				4) Increase the setting values for P01.12–P01.19 (accel./decel. time)
				5) Adjust the V/F curve (Motor 1, P01.01–P01.08), especially the setting
				value for the mid-point voltage (if the mid-point voltage is set too
				low, the load capacity decreases at low speed).
			Corrective	6) If error occurs during low-speed operation:
			Actions	a) Decrease low-speed operation time.
				b) Increase the motor capacity.
				7) Adjust P07.26 torque compensation gain until the current reduces and the motor does not stall.
				<ul><li>8) Very speed tracking settings and correct the parameter settings as</li></ul>
				needed.
				a) Start the speed tracking function
				<ul><li>a) Start the speed tracking function.</li><li>b) Adjust the maximum current for P07.09 speed tracking.</li></ul>

Fault Codes (continued)					
Display on GS20(X) Keypad	ID No.	Fault Name and Description	Action, Reset, a	and Corrective Action	
noypuu			Action Level Action Time	P06.10 P06.11	
			Fault setting parameter	<ul> <li>P06.09 setting is:</li> <li>0: No function</li> <li>1: Continue operation after over-torque detection during constant speed operation</li> <li>2: Stop after over-torque detection during constant speed operation</li> <li>3: Continue operation after over-torque detection during RUN</li> <li>4: Stop after over-torque detection during RUN</li> </ul>	
		Over torque 2 (ot2)	Reset method	When P06.09=1 or 3, ot2 is a "Warning". The warning is automatically cleared when the output current < (P06.10 – 5%). When P06.09=2 or 4, ot2 is a "Fault". You must reset manually.	
		When the output	Reset condition	Immediately reset	
		current exceeds the	Record	When P06.09=2 or 4, ot2 is a "Fault", and the fault is recorded.	
ot 2 27	27	over-torque detection level (P06.10) and exceeds over-torque detection time (P06.11), and when P06.09 is set to 2 or 4, the ot2 error displays.	Corrective Actions	<ol> <li>Verify the settings for P06.10 and P06.11.</li> <li>Check for mechanical failure and remove any causes of malfunction.</li> <li>Reduce the load or replace the motor with a higher capacity model.</li> <li>Increase the setting values for P01.12–P01.19 (accel./decel. time)</li> <li>Adjust the V/F curve (Motor 1, P01.35–P01.42), especially the setting value for the mid-point voltage (if the mid-point voltage is set too low, the load capacity decreases at low speed).</li> <li>If error occurs during low-speed operation:         <ul> <li>Decrease low-speed operation time.</li> <li>Increase the motor capacity.</li> </ul> </li> <li>Adjust P07.71 torque compensation gain until the current reduces and the motor does not stall.</li> <li>Very speed tracking settings and correct the parameter settings as needed.         <ul> <li>Start the speed tracking function.</li> <li>Adjust the maximum current for P07.09 speed tracking.</li> </ul> </li> </ol>	
		Under current (uC) Low current detection	Action Level	P06.71	
	28		Action Time Fault setting parameter	P06.72 P06.73 setting is: 0: No function 1: Fault and coast to stop 2: Fault and ramp to stop by the 2nd deceleration time 3: Warn and continue operation	
UΕ			Reset method	When P06.73=3, uC is a "Warning". The warning is automatically cleared when the output current > (P06.71+0.1A). When P06.73=1 or 2, uC is a "Fault". You must reset manually.	
			Reset condition	Immediately reset	
			Record Corrective Actions	<ul> <li>When P06.71=1 or 2, uC is a "Fault", and the fault is recorded.</li> <li>1) Confirm the motor cable is connected properly.</li> <li>2) Verify settings of P06.71, P06.72, and P06.73 and set to correct values if needed.</li> <li>3) Check if the load is too low and whether the motor capacity matches the load.</li> </ul>	
cF2			Action Level	Firmware internal detection	
	31	EEPROM read error (cF2) Internal EEPROM cannot be read	Action Time Fault setting parameter Reset method	cF2 acts immediately when the drive detects the fault N/A Manual reset	
			Reset condition Record Corrective Actions	Immediately reset         Yes         1) Press "RESET" key or reset the parameter to the default setting. If cF2 still occurs, contact AutomationDirect Technical Support.         2) Cycle the power, if cF2 error still occurs, contact AutomationDirect	
				Technical Support.	

Fault Codes (continued)					
Display on GS20(X) Keypad	ID No.	Fault Name and Description	Action, Reset, c	and Corrective Action	
			Action Level Action Time	Hardware detection cd1 acts immediately when the drive detects the fault	
		U-phase error (cd1)	Fault setting parameter	N/A	
cd l	33	U-phase current detection error when	Reset method Reset condition	Power-off N/A	
		power is ON	Record	Yes	
			Corrective Actions	Cycle the power, if cd1 error still occurs, contact AutomationDirect Technical Support.	
			Action Level Action Time	Hardware detection cd2 acts immediately when the drive detects the fault	
		V-phase error (cd2)	Warning setting parameter	N/A	
c d2	34	V-phase current	Reset method	Power-off	
		detection error when power ON	Reset condition Record	N/A Yes	
		power ON	Corrective	Cycle the power, if cd2 error still occurs, contact AutomationDirect	
			Actions	Technical Support.	
			Action Level	Hardware detection	
		W-phase error (cd3)	Action Time Warning setting	cd3 acts immediately when the drive detects the fault	
] ]	25	M shace surrent	parameter	N/A	
cd3	35	W-phase current detection error when	Reset method Reset condition	Power-off N/A	
		power ON	Record	Yes	
			Corrective	Cycle the power, if cd3 error still occurs, contact AutomationDirect	
			Actions	Technical Support.	
		cc hardware error (Hd0) cc (current clamp) hardware protection error when power is ON	Action Level Action Time	Hardware detection Hd0 acts immediately when the drive detects the fault	
			Fault setting		
			parameter	N/A	
HdO	36		Reset method	Power-off	
			Reset condition Record	N/A Yes	
			Corrective	Cycle the power, if Hd0 error still occurs, contact AutomationDirect	
			Actions	Technical Support.	
			Action Level Action Time	Hardware detection Hd1 acts immediately when the drive detects the fault	
		oc bardware error (Hd1)	Fault setting	N/A	
	~-	oc hardware error (Hd1) oc hardware protection error when power is ON	parameter		
Hdl	37		Reset method Reset condition	Power-off N/A	
			Record	Yes	
			Corrective	Cycle the power, if Hd1 error still occurs, contact AutomationDirect	
			Actions	Technical Support.	
			Action Level Action Time	Hardware detection Immediately act	
			Fault setting		
			parameter	N/A	
			Reset method	Manual reset	
			Reset condition Record	Immediately reset Yes	
			Record	<ol> <li>This error can occur if you press the STOP key during auto-tuning.</li> </ol>	
RUE		Auto-tuning error (AUE)		Re-execute auto-tuning.	
				2) Check motor capacity and related parameters.	
	40	Motor auto-tuning		a) Set the correct parameters P01.01–P01.02.	
		error		<ul><li>b) Set P01.00 larger than the motor rated frequency.</li><li>3) Check the motor wiring.</li></ul>	
			Corrective	<ul><li>4) Check for motor shaft lock and remove cause of lock if needed.</li></ul>	
			Actions	5) Check for electromagnetic contactor at output (U/V/W) and make	
				sure the electromagnetic valve is OFF.	
				<ul><li>6) Verify load. If too heavy:</li><li>a) Reduce the load.</li></ul>	
				b) Replace the motor with a larger capacity model.	
				7) Check if accel/decel time is too short, then increase the setting values	
				for P01.12–P01.19 (accel./decel. time) if needed.	
			(contir	nued next page)	

GS20(x) Reypad         D No.         Patter Nome and Pecription         Action, Reset, and Corrective Action           Action, Reset, and Corrective Action         Action, Reset, and Corrective Action           Action Level         When the analog input < 4 mA (only detects 4-20 mA analog Action Time           PDD loss AI2 (AFE)         PD feedback loss (analog feedback signal is only valid when the PID function is enabled)         New PM Construction of the warning is automatically cleared. When P08.09 and AFE is a "Fault", You must reset manually detected and the warning is not recorded PDE 093 or 4. AFE is a "Fault", You must reset manually detected and the warning is not recorded PDE 093 or 4. AFE is a "Fault", You must reset manually detected and the warning is not recorded PDE 093 or 4. AFE is a "Fault", You must reset manually detected and the warning is not recorded PDE 093 or 4. AFE is a "Youring", and the warning is not recorded PDE 093 or 4. AFE is a "Youring", and the warning is not recorded PDE 093 or 4. AFE is a "Youring", and the warning is not recorded PDE 093 or 4. AFE is a "Youring", and the warning is not recorded PDE 093 or 4. AFE is a "Youring", and the warning is not recorded PDE 093 or 4. AFE is a "Youring", and the warning is not recorded PDE 093 or 4. AFE is a "Youring", and the warning is not recorded PDE 095 or rot on onde. When press "RUN" key, PGF2 fault coccurs.           PG feedback total (PG F3)         Action Level Action Time Immediately reset rocount the fault we recorder the motor frequency exceeds the encoder parameter         NA           PG F6 dipack stall (PG F3)         PG feedback stall (PG F3)         Fault and coast to stop         PG F40.10.11 (PG F41)           PG F6 all perror encode	1	Fault Codes (continued)					
PIFE       41       PID loss AI2 (AFE)       Fault setting parameter       P08.09 setting is: 0. Warn and continue operation 1: Fault and ramp to stop 2: Fault and coast to stop 3: VAmm and operate at last frequency. When P08.09 sor 4, AFE is a "Warning", when the feedback sol is only valid when the PID function is enabled         PID feedback loss (analysis)       Reset condition       Men P08.09 sor 4, AFE is a "Fault", You must reset manually the PID function is enabled         PG feedback loss (PGF2)       Action Time       Reset condition       Men P08.09 sor 4, AFE is a "Fault", and the fault is recorded P08.09 sor 4, AFE is a "Warning", and the varning is not recorded P08.09 sor 4, AFE is a "Warning", and the varning is not recorded P08.09 sor 4, AFE is a "Warning", and the varning is not recorder P08.09 sor 4, AFE is a "Warning", and the varning is not recorder P08.09 sor 4, AFE is a "Warning", and the varning is not recorder P08.09 sor 4, AFE is a "Warning", and the varning is not recorder P08.09 sor 4, AFE is a "Warning", and the varning is not recorder P08.09 sor 4, AFE is a "Warning", and the varning is not recorder P08.09 sor 4, AFE is a "Warning", and the varning is not recorder P08.09 sor 4, AFE is a "Warning", and the varning is and the varning is automatically cordect.         PG feedback loss (PGF2)       Action Level Software detection       Action Imme Immediately reset         Corrective fault setting parameter       Action Imme Immediately reset       Reset encoder P10.10         PG feedback stall (PGF3)       P10.12 setting is:       P10.12 setting is:         PG feedback stall (PGF4)       Reset encoder parameters (P10.00 and P10.02) Action Immediately reset		ID No.		Action, Reset, a	and Corrective Action		
PFE       41       PID feedback loss (analog feedback signal is only valid when the PID function is enabled)       Reset method Reset condition       mA, the "Warning" is automatically cleared. When PO8.09=1 or 2, AFE is a "Fault". You must reset manually dimediately reset         PDFE       41       PG feedback loss (PGF2)       Reset method       mA, the "Warning" is automatically cleared. When PO8.09=1 or 2, AFE is a "Fault". You must reset manually dimediately reset         PDFF2       43       PG feedback loss (PGF2)       Action Level       Action Level       Software detection Actions         PDFF2       43       PG feedback loss (PGF2)       Action Level       Software detection Fault setting parameter       MA anual reset         PDFF3       43       PG feedback stall (PGF3)       Action Level       Software detection Actions       Manual reset         PDFF3       44       P10.00 and P10.02 is not set in the PG control mode. When press "RUN" key, PGF2 fault occurs.       Fault setting PAG feedback stall (PGF3)       Manual reset         PDFF3       44       PG feedback stall (PGF3)       Fault setting P10.12 setting is: 0. Warn and continue operation parameter       P10.10 P10.12 setting is: 0. Warn and continue operation parameter       P10.11 P10.12 P10.13 Reset ASR parameters. Verify accel/decel times and reset if P10.13 Action Time P10.14         PDFF4       44       PG Sip error (PGF4)       PG Sip error (PGF4)       PG Sip error (PGF4)       PG Sip error P10.13			PID loss Al2 (AFE)	Action Time Fault setting	P08.09 setting is: 0: Warn and continue operation 1: Fault and ramp to stop 2: Fault and coast to stop 3: Warn and operate at last frequency		
PGF3       43       PG feedback loss (PGF2)       PG feedback loss (PGF2)       Action Level Fault setting parameter       Check for feedback device failure and replace the device w one.         PGF3       43       PG feedback loss (PGF2)       Action Level Fault setting parameter       Software detection Action Time Fault setting       N/A         P10.00 and P10.02 is not set in the PG control mode. When press "RUN" key, PGF2 fault occurs.       Action Level Fault setting       N/A         PGF3       44       PG feedback stall (PGF3)       PG feedback stall (PGF3)       N/A         PGF6       Under PG mode, when the motor frequency exceeds the encoder observer stall (P10.10) and starts to count, the fault time is longer than the detection time of encoder observer stall (P10.11), then PGF3 fault occurs.       P10.12 setting is: Ocrective Action Time       VWarn and continue operation 1: Fault and ramp to stop 2: Fault and coast to stop         PGF4       45       PG slip error (PGF4)       P10.13 Action Time       P10.13 Action Time         PGF4       45       PG slip error (PGF4)       P10.14 P10.13 exet moder the output frequency and motor frequency is smaller than the motor frequency exceeds encoder	RFE	41	(analog feedback signal is only valid when the	Reset condition	mA, the "Warning" is automatically cleared. When P08.09=1 or 2, AFE is a "Fault". You must reset manually.		
PGF2       43       P10.00 and P10.02 P10.00 and P10.02 fault setting press "RUN" key, PGF2 fault setting       Action Time       Immediately act Fault setting PVA         PGF3       43       P10.00 and P10.02 fault occurs.       Reset condition       Immediately reset Reset condition         PGF53       PG feedback stall (PGF3)       PG feedback stall (PGF3)       Action Level fault setting P10.10       P10.10         PGF4       PG feedback stall (PGF3)       P10.10 Action Time       P10.11 P10.12 setting is: 0: Warn and continue operation parameter       0: Warn and continue operation parameter         PGF4       Ata       PG feedback stall (PGF3)       Fault setting parameter       0: Warn and continue operation parameter       P10.10 P10.12 setting is: 0: Warn and continue operation parameter         PGF4       PG slip error (PGF4)       PG slip error (PGF4)       PG slip error (PGF4)       P10.13 P10.15 setting is: Fault setting parameter       1) Reset encoder parameters. Verify accel/decel times and reset if 4) Reset PG feedback stall values, P10.10 and P10.11.         PG slip error (PGF4)       P10.15 setting is: Fault setting parameter       1) Reset and const to stop 2: Fault and ramp to				Actions	<ul> <li>cable with a new one if needed.</li> <li>2) Check for feedback device failure and replace the device with a new one.</li> <li>3) Check all the wiring. If AFE fault still exists, contact AutomationDirect Technical Support.</li> </ul>		
PGF2       43       Fault setting parameter interest							
PGFY       45       PG slip error (PGFY)       PG slip error (PGF4)       PG slip error (PGF4)       Reset condition       Immediately reset Record       Yes         PGFFY       44       PG slip error (PGF4)       PG slip error (PGF4)       Reset condition       Immediately reset Record       Yes         PGFFY       45       PG slip error (PGF4)       Reset condition       Immediately reset Record       Yes         PGFFY       45       PG slip error (PGF4)       Reset method       Action Level P10.12       P10.12       Reset not control mode is selected (P00.11=1).	0053	12		Fault setting parameter	N/A		
PGF4       44       PG set stall evel (PGF3)       1) Reset encoder parameters (P10.00 and P10.02) (2) Verify correct control mode is selected (P00.11=1). (PGF3)         PG feedback stall (PGF3)       PG feedback stall (PGF3)       Action Level P10.10         Under PG mode, when the motor frequency exceeds the encoder observer stall level (P10.10) and starts to count, the fault time is longer than the detection time of encoder observer stall (P10.11), then PGF3 fault occurs.       Fault setting P10.12 setting is: 0: Warn and continue operation parameter (P10.01)         Corrective Altion Time P10.11       P10.12 setting is: 0: Warn and continue operation parameter (P10.01)       P10.12 setting is: 0: Warn and continue operation parameter (P10.01)         PGF4       Fault setting fire is longer than the detection time of encoder observer stall (P10.11), then PGF3 fault occurs.       Reset method       Manual reset (P10.01)         PGF4       PG slip error (PGF4)       PG slip error (PGF4)       Action Level P10.13       P10.15 setting is: 0: Warn and continue operation 1: Fault and ramp to stop 2: Fault and coast	PSFC	43	is not set in the PG control mode. When	Reset condition	Immediately reset		
PGF3       Action Time       P10.11         PGF3       Under PG mode, when the motor frequency exceeds the encoder observer stall level (P10.10) and starts to count, the fault stetting of encoder observer stall (P10.10) and starts to count, the fault stetting of encoder observer stall (P10.11), then PGF3 fault occurs.       Reset method       Manual reset         Reset nethod       Manual reset       Reset necoder parameter (P10.01)       Immediately reset         Record       Yes       Yes         Reset necthod       Neset encoder parameter (P10.01)       Immediately reset         Record       Yes       Yes         Action Time       P10.13         Action Time       P10.14         PGF4       PG slip error (PGF4)         Under PG mode, when the motor frequency exceeds encoder       Fault setting parameter         PG Slip error (PGF4)       Under PG mode, when the motor frequency exceeds encoder         Vesceeds encoder       Sest method         Auto: When P10.15=0, PGF4 is a "Warning". When the deviation the output frequency and motor frequency is smaller than to observer slip range (010.13) and starts the output frequency and motor frequency is smaller than to observer slip range.			fault occurs.	Corrective Actions	<ol> <li>Reset encoder parameters (P10.00 and P10.02)</li> <li>Verify correct control mode is selected (P00.11=1).</li> </ol>		
PGF4       45       PGF4       45       Reset condition       Interdately reset         PGF4       45       (P10.10) and starts to count, the fault time is longer than the detection time of encoder observer stall (P10.11), then PGF3 fault occurs.       1)       Reset encoder parameter (P10.01)         2)       Value for P01.00 may be too low, set a higher value.       3)       Reset ASR parameters. Verify accel/decel times and reset if 4)         2)       Value for P01.00 may be too low, set a higher value.       3)       Reset ASR parameters. Verify accel/decel times and reset if 4)         4       Reset PG feedback stall values, P10.10 and P10.11.       Action Level       P10.13         Action Time       P10.14       P10.15 setting is:       0:         9       Fault setting parameter       0:       Warn and continue operation 1: Fault and ramp to stop 2: Fault and coast to stop         2)       Value frequency and motor frequency is smaller than to observer slip range, the warning is automatically cleared.         45       (PGF4) is a "Fault" and you must r manaully.	0053		<ul> <li>(PGF3)</li> <li>Under PG mode, when the motor frequency exceeds the encoder observer stall level (P10.10) and starts to count, the fault time is longer than the detection time of encoder observer stall (P10.11), then PGF3</li> </ul>	Action Time Fault setting parameter	P10.11 P10.12 setting is: 0: Warn and continue operation 1: Fault and ramp to stop 2: Fault and coast to stop		
PG slip error (PGF4) Under PG mode, when the motor frequency exceeds encoder observer slip range (PGF4) 45 Action Time P10.14 P10.15 setting is: 0: Warn and continue operation 1: Fault and ramp to stop 2: Fault and coast to stop Auto: When P10.15=0, PGF4 is a "Warning". When the deviation the output frequency and motor frequency is smaller than to observer slip range, the warning is automatically cleared. Manual: When P10.15=1 or 2, PGF4 is a "Fault" and you must re manaully.	P9F3 44	44		Record Corrective Actions	<ol> <li>Yes</li> <li>Reset encoder parameter (P10.01)</li> <li>Value for P01.00 may be too low, set a higher value.</li> <li>Reset ASR parameters. Verify accel/decel times and reset if needed.</li> <li>Reset PG feedback stall values, P10.10 and P10.11.</li> </ol>		
PGF4       45       Under PG mode, when the motor frequency exceeds encoder observer slip range       Reset method       Auto: When P10.15=0, PGF4 is a "Warning". When the deviation the output frequency and motor frequency is smaller than to observer slip range, the warning is automatically cleared. Manual: When P10.15=1 or 2, PGF4 is a "Fault" and you must remanaully.				Action Time Fault setting	P10.14 P10.15 setting is: 0: Warn and continue operation 1: Fault and ramp to stop		
	P9F4	45	Under PG mode, when the motor frequency exceeds encoder		<ul> <li>Auto: When P10.15=0, PGF4 is a "Warning". When the deviation between the output frequency and motor frequency is smaller than the encoder observer slip range, the warning is automatically cleared.</li> <li>Manual: When P10.15=1 or 2, PGF4 is a "Fault" and you must reset manaully.</li> </ul>		
Reset conditionImmediately resetto count, the fault time is longer than the detection time of encoder observer slip (P10.14), PGF4 fault occurs.Reset conditionImmediately reset1)Reset PG feedback parameters (P10.13 and P10.14) 2)2)Reset ASR parameters. Verify accel/decel times and reset if 3)3)Reset encoder parameters (P0.01).4)Verify torque limit and set new values if needed (P06.12, P11.17-P11.20)5)Check for and resolve any causes of motor shaft lock.				Record Corrective	<ul> <li>Immediately reset</li> <li>When P10.15=1 or 2, PGF4 is a "Fault" and the fault is recorded.</li> <li>1) Reset PG feedback parameters (P10.13 and P10.14)</li> <li>2) Reset ASR parameters. Verify accel/decel times and reset if needed.</li> <li>3) Reset encoder parameters (P0.01).</li> <li>4) Verify torque limit and set new values if needed (P06.12, P11.17-P11.20)</li> <li>5) Check for and resolve any causes of motor shaft lock.</li> <li>6) Check the mechanical brake has released correctly and verify the</li> </ul>		

Display on		Fault Name and		Codes (continued)
GS20(X) Keypad	ID No.	Fault Name and Description	Action, Reset, o	and Corrective Action
			Action Level	When the analog input is < 4 mA (only detects 4–20 mA analog input)
			Action Time	Immediately act
				P03.19 setting is:
			Facult anticas	0: Disable
			Fault setting parameter	1: Continue operation at the last frequency (warning, ANL is displayed on the keypad)
			parameter	2: Decelerate to stop (warning, ANL is displayed on the keypad)
		AI2 loss (ACE)		3: Stop immediately and display ACE
				When P03.19=1 or 2, ACE is a "Warning". When analog input signal is >
AEE	48	Analog input loss	Reset method	mA, the warning is automatically cleared.
		(including all the 4–20	<b>D</b> ( 111	When P03.19=3, ACE is a "Fault". You must reset manually.
		mA analog signal)	Reset condition Record	Immediately reset When P03.19=3, ACE is a "Fault", and the fault is recorded.
			Record	1) Check the Al2 feedback cable and tighten the terminal. Replace the
				cable with a new one if needed.
			Corrective	2) Check for external device failure and replace the device with a new
			Actions	one.
				3) Check all the wiring. If ACE fault still exists, contact AutomationDirec
			Action Level	Technical Support. DIx=10: External fault (EF) and the DI terminal is ON
			Action Time	Immediately act
		External fault (EF) External fault. When the drive decelerates		P07.20 setting is:
				0: Coast to stop
			Fault setting parameter	1: Stop by the 1st deceleration time
				2: Stop by the 2nd deceleration time
				<ul><li>3: Stop by the 3rd deceleration time</li><li>4: Stop by the 4th deceleration time</li></ul>
EF	49			5: System deceleration
		based on the setting		6: Automatic deceleration (P01.46)
		of P07.20, the EF fault displays on the keypad.	Reset method	Manual reset
		displays on the keypad.	Reset condition	Manual reset only after the external fault is cleared (terminal status is
			Record	recovered) Yes
			Corrective	
			Actions	Press RESET key after the fault is cleared.
		Emergency stop (EF1)	Action Level	DIx=28: Emergency Stop (EF1) and the DI terminal is ON
			Action Time	Immediately act
		When the contact	Fault setting parameter	N/A
		of DIx=EF1 is ON,	Reset method	Manual reset
EFI	50	the output stops		Manual reset only after the external fault is cleared (terminal status is
		immediately and displays EF1 on the	Reset condition	recovered)
		keypad. The motor is in	Record	Yes
		free running.	Corrective Actions	Verify if the system is back to normal condition, and then press "RESET"
		External base block (bb)		key to go back to the default. Dlx=11: Base Block (BB) and the DI terminal is ON
			Action Time	Immediately act
		When the contact	Fault setting	N/A
		of DIx=bb is ON,	parameter	
66	51	the output stops	Reset method	The display "bb" is automatically cleared after the fault is cleared.
		immediately and	Reset condition Record	N/A No
		displays bb on the keypad. The motor is in	Corrective	Verify if the system is back to normal condition, and then press "RESET"
		free running.	Actions	key to go back to the default.
	1	in de ranning.		nued next page)

Dianlascon			Fault C	Codes (continued)
Display on GS20(X) Keypad	ID No.	Fault Name and Description	Action, Reset, a	and Corrective Action
			Action Level	Entering the wrong password three consecutive times
			Action Time	Immediately act
			Fault setting	N/A
		Deserve and in the alternat	parameter	
		Password is locked	Reset method	Manual reset Power-off
		(Pcod)	Reset condition Record	Yes
Pcod	52	Entering the wrong password three consecutive times through P00.07	Corrective Actions	<ol> <li>Input the correct password after rebooting the motor drive.</li> <li>If you forget the password, do the following steps:         <ul> <li>a) Step 1: Input 9999 and press ENTER.</li> <li>b) Step 2: Repeat step 1. Input 9999 and press ENTER.</li> <li>(You need to finish step 1 and step 2 within 10 seconds. If you don't finish the two steps in 10 seconds, try again.)</li> </ul> </li> <li>The parameter settings return to the default when the "Input 9999" process is finished.</li> </ol>
			Action Level	When the function code is not 03, 06, 10, or 63.
			Action Time	Immediately act
			Fault setting	N/A
			parameter Reset method	
			Reset method Reset condition	Manual reset Immediately reset
		Illegal command (CE1) Communication command is illegal	Record	No
EEI 5	54		Corrective Actions	<ol> <li>Check if the communication command is correct.</li> <li>Verify the wiring and grounding of the communication circuit. It is recommended to separate the communication circuit from the main circuit, or wire in 90 degree for effective anti-interference performance.</li> <li>Check if the setting for P09.04 is the same as the setting for the upper unit.</li> <li>Check the cable and replace it if necessary.</li> </ol>
			Action Level	When the data address is correct.
			Action Time	Immediately act
			Fault setting	N/A
			parameter Reset method	Manual reset
		Illogal data addrocc	Reset condition	Immediately reset
		Illegal data address (CE2) Data address is illegal	Record	No
CE2 55	55		Corrective Actions	<ol> <li>Check if the communication command from the upper limit is correct</li> <li>Verify the wiring and grounding of the communication circuit. Separate the communication circuit from the main circuit, or wire in 90 degree for effective anti-interference performance.</li> <li>Check if the setting for P09.04 is the same as the setting for the upper unit.</li> <li>Check the cable and replace it if necessary.</li> </ol>
			Action Level	When the data length is too long
			Action Time	Immediately act
			Fault setting	N/A
			parameter Reset method	Manual reset
CE3			Reset condition	Immediately reset
		Illegal data value (CE3)	Record	No
	56	66 Data value is illegal	Corrective Actions	<ol> <li>Check if the communication command from the upper limit is correct</li> <li>Verify the wiring and grounding of the communication circuit. Separate the communication circuit from the main circuit, or wire in 90 degree for effective anti-interference performance.</li> <li>Check if the setting for P09.04 is the same as the setting for the upper unit.</li> </ol>
				4) Check the cable and replace it if necessary.

Fault Codes (continued)				
Display on GS20(X) Keypad	ID No.	Fault Name and Description		and Corrective Action
			Action Level	When the data is written to read-only address.
			Action Time	Immediately act
			Fault setting	N/A
			parameter	N/A
		Data is written to read-	Reset method	Manual reset
		only address (CE4)	Reset condition	Immediately reset
EEH	57		Record	No
	57	Data is written to read- only address	Corrective Actions	<ol> <li>Check if the communication command from the upper limit is correct.</li> <li>Verify the wiring and grounding of the communication circuit. Separate the communication circuit from the main circuit, or wire in 90 degree for effective anti-interference performance.</li> <li>Check if the setting for P09.04 is the same as the setting for the upper unit.</li> <li>Check the cable and replace it if necessary.</li> </ol>
			A attack lawal	When the communication time exceeds the detection time for P09.03
			Action Level	communication time-out.
			Action Time	P09.03
		Modbus transmission time-out (CE10) 3	Fault setting parameter	P09.02 0: Warn and continue operation 1: Fault and ramp to stop 2: Fault and coast to stop
				3: No warning, no fault, and continue operation
			Reset method	Manual reset
CE 10	58		Reset condition	Immediately reset
		Modbus transmission	Record	Yes
		time-out occurs	Corrective Actions	<ol> <li>Check if the upper unit transmits the communication command within the setting time for P09.03.</li> <li>Verify the wiring and grounding of the communication circuit. Separate the communication circuit from the main circuit, or wire in 90 degree for effective anti-interference performance.</li> <li>Check if the setting for P09.04 is the same as the setting for the upper unit.</li> <li>Check the cable and replace it if necessary.</li> </ol>
				1) ydc occurs when the confirmation signals of Y-connection and
			Action Level	<ul> <li>Δ-connection are conducted at the same time.</li> <li>2) If any of confirmation signals is not conducted within P05.25, ydc occurs.</li> </ul>
			Action Time	P05.25
		Y-connection / ∆-connection switch	Fault setting parameter	N/A
Уdс	61	error (ydc)	Reset method	Manual reset
JUL		An error occurs when Y-Δ switches	Reset condition	Can be reset only when the confirmation signal of Y-connection is conducted if it is Y-connection, or when the confirmation signal of Δ-connection is conducted if it is Δ-connection.
			Record	Yes
			Corrective Actions	<ol> <li>Check if the electromagnetic valve works normally during switch. If not, replace it.</li> <li>Check if related parameters are all set up and set correctly.</li> <li>Check the wiring of the Y-Δ switch function.</li> </ol>
			(contir	nued next page)

			Fault C	Codes (continued)
Display on GS20(X) Keypad	ID No.	Fault Name and Description	Action, Reset, a	and Corrective Action
			Action Level	When P07.13 is not 0, and the DC bus voltage is lower than the level of dEb.
			Action Time	Immediately act
		Deceleration energy	Fault setting	N/A
dЕЪ	62	backup error (dEb) When P07.13 is not 0, and the power is suddenly off, causing the DC bus voltage lower than the dEb action level, the dEb	parameter Reset method	When P07.13=2 (dEb with auto-acceleration / auto-deceleration, the drive outputs the frequency after the power is restored): dEb is automatically cleared. When P07.13=1 (dEb with auto-acceleration / auto-deceleration, the drive does not output the frequency after the power is restored): The drive stops when dEb acts and the rotation speed becomes 0 Hz, then the drive can be reset manually.
		function acts and the motor ramps to stop.	Reset condition	Auto: The fault is automatically cleared. Manual: When the drive decelerates to 0 Hz.
		Then dEb displays on	Record	Yes
		the keypad.	Corrective Actions	<ol> <li>Check that the power system is not unstable or off.</li> <li>If another large load operates in the same power system:         <ul> <li>a) Replace power system with a larger capacity model.</li> <li>b) Ensure the large load system is on a different power system.</li> </ul> </li> </ol>
		Over alia error (SL)	Action Level	P07.29 100% of P07.29 = the maximum limit of the slip frequency (P10.29)
		Over slip error (oSL)	Action Time	P07.30
		<ul> <li>On the basis of the maximum slip limit set via P10.29, the speed deviation is abnormal.</li> <li>When the motor drive outputs at constant speed, F&gt;H or F<h and="" exceeds="" exceeds<="" it="" level="" li="" p07.29,="" set="" the="" via=""> </h></li></ul>	Fault setting parameter	P07.31 setting is: 0: Warn and continue operation 1: Fault and ramp to stop 2: Fault and coast to stop 3: No warning
oSL	63		Reset method	P07.31=0 is a warning. When the motor drive outputs at constant speed, and F>H or F <h anymore,="" does="" exceed="" level="" not="" osl<br="" p07.29="" set="" the="" via="">warning will be cleared automatically. When P07.31=1 or 2, oSL is an error, and it needs to reset manually.</h>
		the time set via P07.30,	Reset condition	Immediately reset
		oSL shows. oSL occurs in induction motors only.	Record Corrective Actions	<ul> <li>P07.31=1 or 2, oSL is "Fault", and the fault is recorded.</li> <li>1) Verify the group 5 motor parameters.</li> <li>2) Decrease the load</li> <li>3) Check the setting of oSL protection function related parameters P07.29, P07.30, and P10.29</li> </ul>
			Action Level	Hardware detection
			Action Time Fault setting parameter	Immediately act N/A
_		STO Loss 1 (STL1)	Reset method	Hardware failure, and cannot reset. Cycle the power.
Srl I	72	STO1–SCM1 internal	Reset condition	N/A
		loop detection error	Record Corrective Actions	<ol> <li>Yes</li> <li>Verify the STO1 and SCM1 short circuit lines are connected. Re- connect the short circuit line if needed. Ensure all wiring is correct.</li> <li>Verify the connections at the drive control terminals.</li> <li>If issue still persists, contact AutomationDirect Technical Support.</li> </ol>
			Action Level	Hardware detection
5ro	76	STO (STo) Safety Torque Off function active	Action Time Fault setting parameter Reset method Reset condition Record	Immediately act N/A When P06.44=1 and after STo error is cleared, it automatically resets. When P06.44=0 and after STo error is cleared, reset it manually. Reset only after STo error is cleared. Yes 1) Reset the STO1/SCM1 and STO2/SCM2 switch (ON) and cycle the
			Corrective Actions	<ul> <li>power.</li> <li>2) Verify the connections at the drive control terminals.</li> <li>3) If issue still persists, contact AutomationDirect Technical Support.</li> </ul>

Display on Bosol(X) Keypad         D No.         Fault Name and Description         Action, Reset, and Corrective Action           5rL2         77         STO Loss 2 (STL2) STO Loss 2 (STL2)         Action Iewel Fault setting Fault setting op detection error         Hardware detection Action Time Fault setting Parameter         N/A           5rL3         78         STO Loss 3 (STL3)         Reset condition Reset condition Action Time fault setting Parameter         N/A           5rL3         78         STO Loss 3 (STL3)         Action Time fault setting Parameter         N/A           5rL3         78         STO Loss 3 (STL3)         Action Iewel Action Time fault setting Parameter         Hardware detection Action State SCM2 internal loop detection error         Action Level Action Time fault setting Parameter         Hardware detection N/A           5rL3         78         STO Loss 3 (STL3)         Reset condition SCM2 internal loop detection error         N/A           6cord         Yes         Yes         Yes         Yes         Yes           79         U-phase over-current before run (Acc)         Action Level Action L				Fault C	Codes (continued)
SrL2     Tr     Action Time Immediately act Fault setting parameter     Immediately act N/A       STO Loss 2 (STL2)     STO2-SCM2 internal loop detection error     Reset method Corrective Actions     N/A       STO Loss 3 (STL3)     STO Loss 3 (STL3)     Rest method Record     N/A       STO Loss 3 (STL3)     STO Loss 3 (STL3)     Action Level Action     N/A       STO Loss 3 (STL3)     STO Loss 3 (STL3)     Action Immediately act Action Immediately act     N/A       STO Loss 3 (STL3)     STO1-SCM1 and STO2- SCM2 internal loop detection error     Action Immediately act Action Immediately act     N/A       Reset method detection error     Reset condition N/A     N/A     Reset method Record     N/A       STO1-SCM1 and STO2- SCM2 internal loop detection error     Record     Verify the STO1 and SCM1 or STO2 and SCM2 short circuit lines are connected. Re-connect the short circuit lines in feeded. Ensure all wring is correct.     N/A       N/A     Record     Verify the STO1 and SCM1 or STO2 and SCM2 short circuit lines are connected. Re-connect the short circuit line if needed. Ensure all wring is correct.       N/A     Record     Verify the rated current fault setting viring is correct.       V-phase over-current before run (Aoc)     Reset ondition Record     N/A       Record     Verify the material method and remove causes of any short circuits, or replace the cable before turning and the UVW wring of the drive output terminal are correct.       V-phase short				Action, Reset, o	and Corrective Action
SrL2     77     STO Loss 2 (STL2)     Fault setting parameter Reset method     Hardware failure, and cannot reset. Cycle the power.       Record     N/A     Record     N/A       Record     Yes     Corrective Actions     1) Verify the STO2 and SCM2 short circuit lines are connected. Record Insue parameter       STO Loss 3 (STL3)     STO Loss 3 (STL3)     Action Level     Hardware failure, and cannot reset. Cycle the power.       STO Loss 3 (STL3)     Action Level     Hardware failure, and cannot reset. Cycle the power.       Fault setting     N/A       STO Loss 3 (STL3)     Reset method     Hardware failure, and cannot reset. Cycle the power.       Fault setting     N/A     Reset condition     Reset condition       STO Loss 3 (STL3)     Reset method     Hardware failure, and cannot reset. Cycle the power.       Fault setting     N/A     Record     Yes       STO Loss 3 (STL3)     Store control terminals.     Yes       STO Loss 3 (STL3)     If the issue persists, contact AutomationDirect Technical Support.       Verify the connections at the drive control terminals.     Yes       Corrective     Action Time     Immediately act       Pault setting     N/A					
SrL2     To     Loss 2 (STL2)     parameter anter anter and a cannot reset. Cycle the power.       SrD2-SCM2 internal loop detection error     Resert method Hardware failure, and cannot reset. Cycle the power.     Record Yes       Corrective Actions 2:     1) Verify the STO2 and SCM2 short circuit lines are connected. Record Yes     1) Verify the connections at the drive control terminals.       STO Loss 3 (STL3)     STO Loss 3 (STL3)     The issue persists, contact AutomationDirect Technical Support.       STO1-SCM1 and STO2-SCM2 internal loop detection error     Action Time Immediately act Fault setting N/A       Reset method     Hardware failure, and cannot reset. Cycle the power.       Reset method     Hardware failure, and cannot reset. Cycle the power.       Reset method     Hardware failure, and cannot reset. Cycle the power.       Record     Yes       Corrective     Action Time Immediately act       Action Time Action Time Immediately act     Reset method       Record     Yes       Corrective     Action Time Immediately act       Action Time Action Time Immediately act     Record Yes       U-phase over-current before run (Acc)     Action Time Immediately act       Fault setting parameter     N/A       Record     Yes       Yes     Corrective Action Reset in five seconds after the fault clears       Record     Yes       Ou-phase short circuit deter the add are ordere					Immediately act
SrL2     To Loss 2 (STL2)     parameter failure, and cannot reset. Cycle the power. Reset econdition     N/A       STO2-SCM2 Internal loop detection error     Record     Yes       Corrective Actions     1) Verify the STO2 and SCM2 shot circuit lines are connected. Re- connect the shot circuit line if needed. Ensure all wining is correct.     2) Verify the connections at the drive control terminals.       3) If the issue persists, contact AutomationDirect Technical Support.     Action Level     Hardware detection       Action Internal Parameter     N/A     Reset econdition     N/A       Reset econdition     N/A     Reset econdition     N/A       Verify the connecti					N/A
SrL2     77     ST02-SCM2 internal loop detection error     Reset condition     N/A       Reset condition     N/A     Record     Yes       Corrective     Action Level     1)     Werfy the ST02 and SCM2 short circuit lines are connected. Re- connect the short circuit line in medele. Ensure all wing is correct.       2/ Verify the connections at the drive control terminals.     3)     If the issue persists, contact AutomationDirect Technical Support.       3/ To Loss 3 (STL3)     ST0 Loss 3 (STL3)     Record     N/A       ST0 Loss 3 (STL3)     ST0 Loss 3 (STL3)     Record     N/A       ST0 Loss 3 (STL3)     Record     N/A     Record       ST0 Loss 3 (STL3)     ST0 Loss 3 (STL3)     Record     N/A       ST0 Loss 3 (STL3)     Record     N/A       ST0 Loss 3 (STL3)     Record     N/A       Record     Yes     N/A       Reset condition     N/A       Record     Yes       Corrective     Action Level       Action Level     300% of the rated current       Action Level     300% of the rated current       Action Level     MA       Parameter     Record       Paul setting     N/A       Record     Yes       10     U-phase short circuit       Paul setting     N/A       Recor			STO Loss 2 (STL2)		
First Side-Schild internal loop       Record       Yes         0 p detection error       Corrective Actions       1) Verify the STO2 and SCM2 short circuit lines are connected. Reconnect the short circuit line if needed. Ensure all wiring is correct.         2) Verify the connections at the drive control terminals.       3) If the issue persists, contact AutomationDirect Technical Support.         3) STO Loss 3 (STL3)       Action Time Immediately act       Reset condition         5rL3       78       STO1-SCM1 and STO2-SCM1 and STO2-SCM2 internal loop detection error       Reset condition         6       STO1-SCM1 and STO2-SCM2 internal loop detection error       Reset condition       N/A         78       STO1-SCM1 and STO2-Record       Reset condition       N/A         Record       Yes       Corrective Actions 2       Nerfy the STO1 and SCM1 or STO2 and SCM2 short circuit lines are connected. Re-connect the short circuit line if needed. Ensure all wiring is correct.         79       U-phase over-current before run (Aoc)       Action Time       Immediately act         9       U-phase short circuit detection risulation Reset in five seconds after the fault clears       Record         79       U-phase short circuit detection run (Aoc)       Yes       1) Check if the motor's internal wiring and the UVW wiring of the drive output terminal are correct.         79       U-phase short circuit detected when the output wiring detection run son insulation and the	E - 1 - 2	77			
Roc       79       U-phase over-current before run (Aoc)         U-phase short circuit dine for short circuit line if needed. Ensure all wiring is correct.       2) Verify the connections at the drive control terminals.         10       STO Loss 3 (STL3)         STO Loss 3 (STL3)       Action Level         Attion Level       Hardware detection         Action Time       Immediately act         Fault setting       N/A         Reset method       Hardware failure, and cannot reset. Cycle the power.         Reset condition       N/A         Reset condition       N/A         Reset condition       N/A         Reset condition       N/A         Record       Yes         Orrective       1) Verify the STO1 and SCM1 or STO2 and SCM2 short circuit lines are connected. Re-connect the short circuit line if needed. Ensure all wriving is correct.         2) Verify the connections at the drive control terminals.       3) If the issue persists, contact AutomationDirect Technical Support.         3) If the issue persist, contact AutomationDirect Technical Support.       30% of the rated current         Action Level       N/A         Reset condition       Reset in five seconds after the fault clears         Record       Yes         10phase short circuit detection is performed before the drive condrol in the wring of the cortrol value with	סרוכ	//	STO2–SCM2 internal		
F-L3       78       STO Loss 3 (STL3)       Action Level       Hardware detection         STO Loss 3 (STL3)       STO-Loss 3 (STL3)       Action Time       Immediately act         Fault setting parameter       N/A         Record       Yes         Corrective Actions       1)       Verify the STO1 and SCM1 or STO2 and SCM2 short circuit lines are connect the short circuit line if needed. Ensure all wiring is correct.         2)       Verify the connect the short circuit line if needed. Ensure all wiring is correct.         2)       Verify the connect the short circuit line if needed. Ensure all wiring is correct.         2)       Verify the connect the short circuit line if needed. Ensure all wiring is correct.         2)       Verify the connect the short circuit line if needed. Ensure all wiring is correct.         2)       Verify the connect the short circuit line if needed. Ensure all wiring is correct.         2)       Verify the connect the short circuit line if needed. Ensure all wiring of the drive control terminals.         3)       If the issue persists, contact AutomationDirect Technical Support.         Action Time       Immediately act         Fault setting       N/A         Reset condition       Reset in five seconds after the fault clears         Record       Yes         1)       U-phase short circuit detection is before turning of the control insulation va			loop detection error	Corrective	<ol> <li>Verify the STO2 and SCM2 short circuit lines are connected. Re- connect the short circuit line if needed. Ensure all wiring is correct.</li> <li>Verify the connections at the drive control terminals.</li> </ol>
Fact 3       78       STO Loss 3 (STL3)       Fault setting parameter Reset condition N/A         Reset condition N/A       Reset condition N/A         Record       Yes         1) Verify the STO1 and SCM1 or STO2 and SCM2 short circuit lines are connected. Re-connect the short circuit line if needed. Ensure all wiring is correct.         2) Verify the connections at the drive control terminals.       3) If the issue persists, contact AutomationDirect Technical Support.         Action Level       30% of the rated current         Action Level       30% of the rated current         Action Level       MA         Reset condition       Reset condition         Reset method       Manual reset         Record       Yes         10-phase over-current before run (Aoc)       Verify the motor is internal wiring on the power.         2) U-phase short circuit detected when the output wiring detection is performed before the drive runs.       N/A         Record       Yes       1) Check if the motor is internal wiring and the UVW wiring of the drive output terminal are correct.         2) Check the motor current before run (Aoc)       Corrective Actions       1) Check if the motor's internal wiring on the power.         3) Check the calbe before the drive runs.       1) Check if the motor is internal wiring on the courbul side (U/WW).         6) Check the length the motor calbe. If it's too long: a) Increase the AC motor dr				Action Level	
STO Loss 3 (STL3)     parameter <sup>-</sup> Reset method SCM2 internal loop detection error     N/A Record       78     STO1-SCM1 and STO2- SCM2 internal loop detection error     Record     Yes       Corrective Actions     1)     Verify the STO1 and SCM1 or STO2 and SCM2 short circuit lines are connected. Re-connect the short circuit line if needed. Ensure all wiring is correct.       2)     Verify the connections at the drive control terminals.       3)     If the issue persists, contact AutomationDirect Technical Support.       Action Level     300% of the rated current       Action Imme     Immediately act       Fault setting parameter     N/A       Reset condition     Reset in five seconds after the fault clears       Record     Yes       U-phase over-current before run (Aoc)     O Check if the motor's internal wiring and the UVW wiring of the drive output wiring detection is performed before the drive runs.     N/A       79     U-phase short circuit detected when the output wiring detection is performed before the drive runs.     Corrective Actions       6     Corrective Actions     SC Check the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.       9     U-phase short circuit detected when the output wiring detection is performed before the drive runs.     SC Check the motor cable. If it's too long: a) Increase the AC motor drive's capacity. b) Install AC reactor(s) on the output side (U/VW). 6)       0     The Ace may occur due to a short				Action Time	Immediately act
FL3       78       STO Loss 3 (STL3)       parameter       Hardware failure, and cannot reset. Cycle the power.         Reset method       Hardware failure, and cannot reset. Cycle the power.       Reset condition       N/A         SCM2 internal loop detection error       Corrective Actions       'Verify the STO1 and SCM1 or STO2 and SCM2 short circuit lines are connected. Re-connect the short circuit line if needed. Ensure all wiring is correct.         J       Verify the connections at the drive control terminals.       ) If the issue persists, contact AutomationDirect Technical Support.         Action Level       300% of the rated current       Action Time       Immediately act         Fault setting       N/A       Reset condition       Reset or five seconds after the fault clears         Record       Yes       'Ves       'O check life the motor's internal wiring and the UVW wiring of the drive output terminal are correct.         U-phase over-current before run (Aoc)       U-phase short circuit detected when the output wiring detection is performed before the drive runs.       'O check the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.         Gorrective       Corrective       'O check the motor cable. If it's too long: a) Increase the AC motor drive's capacity.         U-phase short circuit detected when the drive runs.       'O check the motor cable. If it's too long: a) Increase the AC motor drive's capacity.         O the motor cable.				Fault setting	N/A
5rL3       78       STO1-SCM1 and STO2- SCM2 internal loop detection error       Record       Yes         Corrective Actions       1)       Verify the STO1 and SCM1 or STO2 and SCM2 short circuit lines are connected. Re-connect the short circuit line if needed. Ensure all wiring is correct.         2)       Verify the connections at the drive control terminals.         3)       If the issue persists, contact AutomationDirect Technical Support.         Action Level       300% of the rated current         Action Time Fault setting parameter       N/A         Record       Yes         V-phase over-current before run (Aoc)       N/A         U-phase short circuit detected when the output wiring detection is performed before the drive runs.       I)       Check if the motor's internal wiring and the UVW wiring of the drive output terminal are correct.         2)       U-phase short circuit detected when the output wiring detection is performed before the drive runs.       Corrective Actions       1)       Check if the motor's internal wiring and the UVW wiring of the drive output terminal are correct.         2)       Check the motor insulation value with megger. Replace the motor if the insulation is poor.       1)       Check the length of the control circuit and the wiring/grounding of the main circuit to grown insulation value with megger. Explace the motor if the insulation is poor.         4)       Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent inteference.<			STO Loss 3 (STL3)		
Figure       79       Stol = Sch and stole store and stole store and store an					
SCM2 internal loop detection error       Image: Network       Image: Network<	5-17	78	STO1–SCM1 and STO2–		,
Pince       79       U-phase over-current before run (Aoc)       Corrective Actions       N/A         Record       Yes       N/A         Record       Yes       Check if the motor's internal wiring on the power.         U-phase over-current before run (Aoc)       Verify the conduct of the motor's internal wiring on the power.         U-phase over-current before run (Aoc)       Corrective Actions       N/A         Record       Yes       Check if the motor's internal wiring and the UVW wiring of the drive output terminal are correct.         U-phase short circuit detected when the output wiring detection is performed before the drive runs.       Corrective Actions       1         Ocheck the length of the contor cable and remove causes of any short circuits, or replace the cable before turning on the power.       3         U-phase short circuit detected when the output wiring detection is performed before the drive runs.       1       Check the motor cable and remove causes of any short circuits, or replace the cable before turning on the output side (U/V/W).         Orrective Actions       1       Corrective Actions       3       Check the length of the motor cable. If it's too long: a) Increase the AC motor drive's capacity.         Distall AC reactor(s) on the output side (U/V/W).       6       The Acc may occur due to a short circuit or ground fault at the output side of the drive. Check for possible short circuits between terminals with an electric meter: a) B1 corresponds to U, V and W.       D) If shor			SCM2 internal loop	Record	
<b>Action Time</b> Immediately act         Fault setting parameter       N/A         Reset method       Manual reset         Reset method       Manual reset         Reset method       Reset in five seconds after the fault clears         Record       Yes         1)       Check if the motor's internal wiring and the UVW wiring of the drive output terminal are correct.         2)       Check the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.         3)       Check the motor insulation value with megger. Replace the motor if the insulation is poor.         4)       Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.         5)       Check the length of the motor drive's capacity.         b)       Install AC reactor(s) on the output side (U/V/W).         6)       The Acc may occur due to a short circuit or ground fault at the output side of the drive. Check for possible short circuits between terminals with an electric meter: <ul> <li>a) B1 corresponds to U, V and W;</li> <li>b) If short circuit occurs, contact AutomationDirect Technical Support.</li> </ul>			detection error	Actions	<ul> <li>connected. Re-connect the short circuit line if needed. Ensure all wiring is correct.</li> <li>2) Verify the connections at the drive control terminals.</li> <li>3) If the issue persists, contact AutomationDirect Technical Support.</li> </ul>
Roc       79       U-phase over-current before run (Aoc)       Reset method       Manual reset         Record       Yes         1)       Check if the motor's internal wiring and the UVW wiring of the drive output terminal are correct.         2)       Check if the motor's internal wiring on the power.         3)       Check the motor insulation value with megger. Replace the motor if the insulation is poor.         4)       Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.         5)       Check the length of the motor cable. If it's too long: <ul> <li>a) Increase the AC motor drive's capacity.</li> <li>b) Install AC reactor(s) on the output side (U/V/W).</li> <li>for the drive. Check for possible short circuits between terminals with an electric meter:</li></ul>					
Rec       79       U-phase over-current before run (Aoc)       Reset ondition       Reset in five seconds after the fault clears         Record       Yes       1)       Check if the motor's internal wiring and the UVW wiring of the drive output terminal are correct.         U-phase over-current before run (Aoc)       1)       Check if the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.         U-phase short circuit detected when the output wiring detection is performed before the drive runs.       Corrective Actions         Corrective Actions       Corrective Actions       1)         Check the length of the motor cable. If it's too long: a) Increase the AC motor drive's capacity.       1)         Define the drive runs.       1)       Install AC reactor(s) on the output side (U/V/W).         6)       The Aoc may occur due to a short circuit or ground fault at the output side of the drive. Check for possible short circuits between terminals with an electric meter:         a)       B1 corresponds to U, V and W;       D)         b)       If short circuit occurs, contact AutomationDirect Technical Support.					Immediately act
Reset method       Manual reset         Reset condition       Reset in five seconds after the fault clears         Record       Yes         1)       Check if the motor's internal wiring and the UVW wiring of the drive output terminal are correct.         2)       Check if the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.         3)       Check the motor insulation value with megger. Replace the motor if the insulation is poor.         4)       Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.         5)       Check the length of the motor cable. If it's too long: <ul> <li>a) Increase the AC motor drive's capacity.</li> <li>b) Install AC reactor(s) on the output side (U/V/W).</li> <li>for the drive. Check for possible short circuits between terminals with an electric meter:             <ul> <li>a) B1 corresponds to U, V and W; DC- corresponds to U, V and W;</li> <li>b) If short circuit occurs, contact AutomationDirect Technical Support.</li> </ul> </li> </ul>					N/A
Recer       Reset condition       Reset in five seconds after the fault clears         Record       Yes         U-phase over-current before run (Aoc)       1)       Check if the motor's internal wiring and the UVW wiring of the drive output terminal are correct.         U-phase short circuit detected when the output wiring detection is performed before the drive runs.       1)       Check the motor cable before turning on the power.         Corrective Actions       Corrective Actions       Corrective Actions       1)       Check the length of the motor cable. If it's too long:         a)       Increase the AC motor drive's capacity.       b)       Install AC reactor(s) on the output side (U/VW).         6)       The Aoc may occur due to a short circuit or ground fault at the output side of the drive. Check for possible short circuits between terminals with an electric meter:         a)       B1 corresponds to U, V and W; DC- corresponds to U, V and W; corresponds to U, V and W.         b)       If short circuit occurs, contact AutomationDirect Technical Support.					Manual reset
Pocc       79       U-phase over-current before run (Aoc)       Record       Yes         U-phase over-current before run (Aoc)       1)       Check if the motor's internal wiring and the UVW wiring of the drive output terminal are correct.         2)       Check the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.         3)       Check the motor insulation value with megger. Replace the motor if the insulation is poor.         4)       Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.         5)       Check the length of the motor cable. If it's too long: a) Increase the AC motor drive's capacity.         b)       Install AC reactor(s) on the output side (U/V/W).         6)       The Aoc may occur due to a short circuit or ground fault at the output side of the drive. Check for possible short circuits between terminals with an electric meter:         a)       B1 corresponds to U, V and W; DC- corresponds to U, V and W; corresponds to U, V and W.         b)       If short circuit occurs, contact AutomationDirect Technical Support.					
<ul> <li>Poc</li> <li>79</li> <li>U-phase over-current before run (Aoc)</li> <li>U-phase short circuit detected when the output wiring detection is performed before the drive runs.</li> <li>Corrective Actions</li> <li>Corrective Actions</li> <li>Corrective Actions</li> <li>Detect the length of the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.</li> <li>Check the motor insulation value with megger. Replace the motor if the insulation is poor.</li> <li>Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.</li> <li>Check the length of the motor cable. If it's too long:         <ul> <li>a) Increase the AC motor drive's capacity.</li> <li>b) Install AC reactor(s) on the output side (U/V/W).</li> <li>The Aoc may occur due to a short circuits between terminals with an electric meter:</li></ul></li></ul>			II-phase over-current		
<ul> <li>Poc</li> <li>79</li> <li>before run (Aoc)</li> <li>U-phase short circuit detected when the output wiring detection is performed before the drive runs.</li> <li>Corrective Actions</li> <li>Corrective Actions</li> <li>Corrective Actions</li> <li>Check the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.</li> <li>Check the motor insulation value with megger. Replace the motor if the insulation is poor.</li> <li>Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.</li> <li>Check the length of the motor cable. If it's too long:         <ul> <li>a) Increase the AC motor drive's capacity.</li> <li>b) Install AC reactor(s) on the output side (U/V/W).</li> <li>The Aoc may occur due to a short circuit or ground fault at the output side of the drive. Check for possible short circuits between terminals with an electric meter:</li></ul></li></ul>					output terminal are correct.
<ul> <li>79 U-phase short circuit detected when the output wiring detection is performed before the drive runs.</li> <li>Corrective Actions</li> <li>Corrective Actions</li></ul>					
<ul> <li>4) Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.</li> <li>5) Check the length of the motor cable. If it's too long:         <ul> <li>a) Increase the AC motor drive's capacity.</li> <li>b) Install AC reactor(s) on the output side (U/V/W).</li> <li>6) The Aoc may occur due to a short circuit or ground fault at the output side of the drive. Check for possible short circuits between terminals with an electric meter:</li></ul></li></ul>	Bec	79			3) Check the motor insulation value with megger. Replace the motor if
<ul> <li>butput wiring detection is performed before the drive runs.</li> <li>Corrective Actions</li> <li>Corrective Actions</li> <li>Increase the AC motor drive's capacity.</li> <li>Install AC reactor(s) on the output side (U/V/W).</li> <li>The Aoc may occur due to a short circuit or ground fault at the output side of the drive. Check for possible short circuits between terminals with an electric meter:         <ul> <li>B1 corresponds to U, V and W; DC- corresponds to U, V and W; corresponds to U, V and W.</li> <li>If short circuit occurs, contact AutomationDirect Technical Support.</li> </ul> </li> </ul>	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
drive runs.       Actions       a) Increase the AC motor drive's capacity.         b) Install AC reactor(s) on the output side (U/V/W).         6) The Aoc may occur due to a short circuit or ground fault at the output side of the drive. Check for possible short circuits between terminals with an electric meter:         a) B1 corresponds to U, V and W; DC- corresponds to U, V and W; corresponds to U, V and W.         b) If short circuit occurs, contact AutomationDirect Technical Support.					
<ul> <li>a) Increase the AC motor drive's capacity.</li> <li>b) Install AC reactor(s) on the output side (U/V/W).</li> <li>6) The Aoc may occur due to a short circuit or ground fault at the output side of the drive. Check for possible short circuits between terminals with an electric meter: <ul> <li>a) B1 corresponds to U, V and W;</li> <li>b) If short circuit occurs, contact AutomationDirect Technical Support.</li> </ul> </li> </ul>				Corrective	5) Check the length of the motor cable. If it's too long:
<ul> <li>6) The Aoc may occur due to a short circuit or ground fault at the output side of the drive. Check for possible short circuits between terminals with an electric meter:</li> <li>a) B1 corresponds to U, V and W; DC- corresponds to U, V and W; corresponds to U, V and W.</li> <li>b) If short circuit occurs, contact AutomationDirect Technical Support.</li> </ul>				Actions	
<ul> <li>side of the drive. Check for possible short circuits between terminals with an electric meter:</li> <li>a) B1 corresponds to U, V and W; DC- corresponds to U, V and W; corresponds to U, V and W.</li> <li>b) If short circuit occurs, contact AutomationDirect Technical Support.</li> </ul>					
<ul> <li>with an electric meter:</li> <li>a) B1 corresponds to U, V and W; DC- corresponds to U, V and W; corresponds to U, V and W;</li> <li>b) If short circuit occurs, contact AutomationDirect Technical Support.</li> </ul>					
<ul> <li>a) B1 corresponds to U, V and W; DC- corresponds to U, V and W; corresponds to U, V and W;</li> <li>b) If short circuit occurs, contact AutomationDirect Technical Support.</li> </ul>					
b) If short circuit occurs, contact AutomationDirect Technical Support.					a) B1 corresponds to U, V and W; DC- corresponds to U, V and W;
					b) If short circuit occurs, contact AutomationDirect Technical
				(contir	

			Fault C	Codes (continued)
Display on GS20(X) Keypad	ID No.	Fault Name and Description	Action, Reset, o	and Corrective Action
<u>кеураа</u>	80	V-phase over-current before run (boc) V-phase short circuit detected when the output wiring detection is performed before the drive runs.	Action Level Action Time Fault setting parameter Reset method Reset condition Record	<ul> <li>300% of the rated current</li> <li>Immediately act</li> <li>N/A</li> <li>Manual reset</li> <li>Reset in five seconds after the fault clears</li> <li>Yes</li> <li>1) Check if the motor's internal wiring and the UVW wiring of the drive output terminal are correct.</li> <li>2) Check the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.</li> <li>3) Check the motor insulation value with megger. Replace the motor if the insulation is poor.</li> <li>4) Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.</li> <li>5) Check the length of the motor cable. If it's too long: <ul> <li>a) Increase the AC motor drive's capacity.</li> </ul> </li> </ul>
			Action Level	<ul> <li>b) Install AC reactor(s) on the output side (U/V/W).</li> <li>6) The Aoc may occur due to a short circuit or ground fault at the output side of the drive. Check for possible short circuits between terminals with an electric meter: <ul> <li>a) B1 corresponds to U, V and W; DC- corresponds to U, V and W; corresponds to U, V and W.</li> <li>b) If short circuit occurs, contact AutomationDirect Technical Support.</li> </ul> </li> <li>300% of the rated current</li> </ul>
COC	81	W-phase over-current before run (coc) W-phase short circuit detected when the output wiring detection is performed before the drive runs.	Action Time Fault setting parameter Reset method Reset condition Record	<ul> <li>Immediately act</li> <li>N/A</li> <li>Manual reset</li> <li>Reset in five seconds after the fault clears</li> <li>Yes</li> <li>1) Check if the motor's internal wiring and the UVW wiring of the drive output terminal are correct.</li> <li>2) Check the motor cable and remove causes of any short circuits, or replace the cable before turning on the power.</li> <li>3) Check the motor insulation value with megger. Replace the motor if the insulation is poor.</li> <li>4) Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.</li> <li>5) Check the length of the motor cable. If it's too long: <ul> <li>a) Increase the AC motor drive's capacity.</li> <li>b) Install AC reactor(s) on the output side (U/V/W).</li> </ul> </li> <li>6) The Aoc may occur due to a short circuit or ground fault at the output side of the drive. Check for possible short circuits between terminals with an electric meter: <ul> <li>a) B1 corresponds to U, V and W; DC- corresponds to U, V and W; corresponds to U, V and W.</li> <li>b) If short circuit occurs, contact AutomationDirect Technical Support.</li> </ul></li></ul>

			Fault C	Codes (continued)
Display on GS20(X) Keypad	ID No.	Fault Name and Description	Action, Reset, o	and Corrective Action
oPL I		Output phase loss U phase (oPL1) U phase output phase loss	Action Level Action Time Fault setting parameter Reset method Reset condition Record	P06.47         P06.46         P06.48: Use the setting value of P06.48 first. If DC braking function activates, use that of P06.46.         P06.45 setting is:         0: Warn and continue operation         1: Fault and ramp to stop         2: Fault and coast to stop         3: No warning         Manual reset         Immediately reset         P06.45=1 or 2 is "Fault", and the fault is recorded.         1) Check for unbalanced three-phase motor impedance. If unbalanced, replace the motor.         2) Verify motor is wired correctly. Check the cable condition and replace
			Corrective Actions	<ul> <li>the cable if necessary.</li> <li>Ensure a single-phase motor is not being used with a three-phase drive</li> <li>Check the flat cable of the control board. Re-do the wiring and test again if the flat cable is loose. If the fault still exists, contact AutomationDirect Technical Support.</li> <li>Verify that the three-phase current is balanced with a current clamp meter. If it is balanced and the oPL1 fault still exists, contact AutomationDirect Technical Support.</li> <li>Make sure the capacity of the drive and motor match each other.</li> </ul>
		Output phase loss	Action Level Action Time	P06.47 P06.46 P06.48: Use the setting value of P06.48 first. If DC braking function
			Fault setting parameter	activates, use that of P06.46. P06.45 setting is: 0: Warn and keep operation 1: Fault and ramp to stop 2: Fault and coast to stop 3: No warning
			Reset method	Manual reset
			Reset condition	Immediately reset
oPL2	83	V phase (oPL2) V phase output phase loss	Record Corrective Actions	<ul> <li>When P06.45=1 or 2, oPL2 is a "Fault", and the fault is recorded.</li> <li>1) Check for unbalanced three-phase motor impedance. If unbalanced, replace the motor.</li> <li>2) Verify motor is wired correctly. Check the cable condition and replace the cable if necessary.</li> <li>3) Ensure a single-phase motor is not being used with a three-phase drive</li> <li>4) Check the flat cable of the control board. Re-do the wiring and test again if the flat cable is loose. If the fault still exists, contact AutomationDirect Technical Support.</li> <li>5) Verify that the three-phase current is balanced with a current clamp meter. If it is balanced and the oPL2 fault still exists, contact AutomationDirect Technical Support.</li> <li>6) Make sure the capacity of the drive and motor match each other.</li> </ul>

Fault Codes (continued)				
Display on GS20(X) Keypad	ID No.	Fault Name and Description	Action, Reset, a	and Corrective Action
			Action Level Action Time	P06.47 P06.46 P06.48: Use the setting value of P06.48 first. If DC braking function activates, use that of P06.46.
			Fault setting parameter	P06.45 setting is: 0: Warn and continue operation 1: Fault and ramp to stop 2: Fault and coast to stop 3: No warning
			Reset method	Manual reset
		Output phase loss	Reset condition	Immediately reset
		W phase (oPL3)	Record	When P06.45=1 or 2, oPL3 is a "Fault", and the fault is recorded.
oPL3	84	W phase output phase loss		<ol> <li>Check for unbalanced three-phase motor impedance. If unbalanced, replace the motor.</li> <li>Verify motor is wired correctly. Check the cable condition and replace the cable if necessary.</li> <li>Ensure a single-phase motor is not being used with a three-phase</li> </ol>
			Corrective Actions	<ul> <li>drive</li> <li>4) Check the flat cable of the control board. Re-do the wiring and test again if the flat cable is loose. If the fault still exists, contact AutomationDirect Technical Support.</li> </ul>
				<ol> <li>Verify that the three-phase current is balanced with a current clamp meter. If it is balanced and the oPL3 fault still exists, contact AutomationDirect Technical Support.</li> <li>Make sure the capacity of the drive and motor match each other.</li> </ol>
			Action Level	Software detection
		Low frequency overload protection (oL3)	Action Time	Immediately act
	87		Fault setting	N/A
			parameter	
			Reset method	Manual reset
. –			Reset condition	Immediately reset
oL3			Record	Yes
		Low frequency and high current protection	Corrective Actions	<ol> <li>Enhance the heat dissipation capacity for the cabinet.</li> <li>Lower the carrier frequency (P00.17).</li> <li>Decrease the voltage settings that correspond to frequency below 15 Hz in the V/F curve.</li> <li>Set P00.11=0 (V/F, general control mode).</li> <li>Replace the drive with a higher power model.</li> </ol>
			Action Level	Reset the software
			Action Time	Immediately act
		Rotor position detection error (roPd)	Fault setting parameter	N/A
			Reset method	Manual reset
<b>D</b> 1	00		Reset condition	Immediately reset
roPd	89	Rotor position detection error protection	Record Corrective Actions	<ol> <li>Yes</li> <li>Check the motor cable for damage and replace if needed.</li> <li>Check the motor coil, if damaged replace the motor.</li> <li>IGBT may be broken. If so, contact AutomationDirect Technical Support.</li> <li>Cycle the power. If roPd still occurs during operation, contact AutomationDirect Technical Support.</li> </ol>
		Ethernet Card Timeout	Action Level	Software detection
Cd 10	97	(CD10) Ethernet communication has not been	Action Time Fault setting parameter Reset method Reset condition	Immediately act N/A Manual reset Immediate reset
		received from the	Pacard	Vor
		external controller (within the	Record	Yes 1) Initiate Ethernet communications from the master controller again.
		Ethernet Timeout window).	Actions	<ul> <li>2) Disable checking for Ethernet Timeout in P9.94.</li> <li>anued next page)</li> </ul>

			Fault C	Codes (continued)	
Display on GS20(X) Keypad	ID No.	Fault Name and Description	Action, Reset, c	and Corrective Action	
			Action Level	P09.31=-1 – -10 (there is no -9), when the internal communication between Slave and Master is abnormal, ictE fault occurs.	
			Action Time	Immediately act	
		InrCOM time-out error	Fault setting parameter	N/A	
		(ictE)	Reset method	Automatically reset after the internal communication is normal	
ictE	111	()	Reset condition	N/A	
		Internal communication overtime error	Record Corrective Actions	<ul> <li>Yes</li> <li>1) Verify the wiring and grounding of the communication circuit. Separate the communication circuit from the main circuit, or wire in 90 degree for effective anti-interference performance.</li> <li>2) Verify the setting for P09.04 is the same as the setting for the upper unit.</li> <li>3) Check the cable and replace it if necessary.</li> </ul>	
			Action Level	Software detection	
			Action Time	Immediately act	
		Internal communication		N/A	
		error (CP20)	parameter		
CP20	121		Reset method	N/A	
		Internal communication	Reset condition	N/A Yes	
		time-out	Corrective		
			Actions	Contact AutomationDirect Technical Support.	
			Action Level	Software detection	
			Action Time	Immediately act	
		Internal communication	Fault setting	N/A	
		error (CP22) Abnormal internal communication	parameter		
CP22	123		Reset method	N/A	
			Reset condition	N/A	
			Record Corrective	Yes	
			Actions	Contact AutomationDirect Technical Support.	
			Action Level	Software detection	
			Action Time	Immediately act	
		Internal communication		N/A	
		error (CP30)	parameter		
CP30	124	Abnormal internal	Reset method	N/A	
			Reset condition	N/A	
		communication	Record Corrective	Yes	
			Actions	Contact AutomationDirect Technical Support.	
			Action Level	Software detection	
		Internal communication	Action Time	Immediately act	
		error (CP32)	parameter	N/A	
CP32	126		Reset method	N/A	
		Abnormal internal	Reset condition	N/A	
		communication	Record	Yes	
			Corrective Actions	Contact AutomationDirect Technical Support.	
			Action Level	Software detection	
			Action Time	Immediately act	
		Internal communication	Fault setting	N/A	
	107	error (CP33)	parameter		
CP33	127		Reset method		
		Abnormal internal communication	Reset condition Record	N/A Yes	
L			Corrective		
			Actions	Contact AutomationDirect Technical Support.	
(continued next page)					

Display on			Fault C	odes (continued)
Display on GS20(X) Keypad	ID No.	Fault Name and Description	Action, Reset, o	and Corrective Action
			Action Level	P14.75
			Action Time Fault setting parameter	P14.76 P14.74 setting is: 0: No function 1: Continue operation after over-torque detection during constant speed operation 2: Stop after over-torque detection during constant speed operation 3: Continue operation after over-torque detection during RUN 4: Stop after over-torque detection during RUN
		Over-torque 3 (ot3)	Reset method	When P14.74=1 or 3, ot3 is a "Warning". The warning is automatically cleared when the output current < P14.75. When P14.74=2 or 4, ot3 is a "Fault". You must reset manually.
		When the output	Reset condition	Immediately reset
		current exceeds the	Record	P14.74=2 or 4, ot3 is a "Fault", and the fault is recorded.
οĽЭ	ot 3 128	over-torque detection	Corrective Actions	<ol> <li>Configure the settings for P14.75 and P14.76 again.</li> <li>Check for mechanical error and remove the causes of malfunction.</li> <li>Verify load and decrease the loading or replace with a motor with larger capacity if load is too high.</li> <li>Verify accel/decel time and increase the setting values for P01.12– P01.19 (accel./ decel. time) if work cycle is too short.</li> <li>Verify V/F voltage and adjust the V/F curve (Motor 3, P01.54–P01.61), especially the setting value for the mid-point voltage (if the mid-point voltage is set too small, the load capacity decreases at low-speed).</li> <li>Replace motor with a larger capacity motor.</li> <li>Check for overload during low-speed operation and decrease the loading during low-speed operation or increase the motor capacity.</li> <li>Verify torque compensation and adjust P07.73 torque compensation gain until the output current decreases and the motor does not stall.</li> <li>Correct the parameter settings for speed tracking. Start the speed tracking function. Adjust the maximum current for P07.09 speed tracking.</li> </ol>
			Action Level	P14.78 P14.79
		Over-torque 4 (ot4) When the output	Action Time Fault setting parameter	P14.77 setting is: 0: No function 1: Continue operation after over-torque detection during constant speed operation 2: Stop after over-torque detection during constant speed operation 3: Continue operation after over-torque detection during RUN 4: Stop after over-torque detection during RUN When P14.77=1 or 3, ot3 is a "Warning". The warning is automatically
			Reset method	cleared when the output current < P14.75. When P14.77=2 or 4, ot3 is a "Fault". You must reset manually.
			Reset condition	Immediately reset
o£4	129	current exceeds the over-torque detection level (P14.78) and exceeds over-torque detection time (P14.79), and when P14.77 is set to 2 or 4, the ot4 error displays.	Record Corrective Actions	<ul> <li>P14.77=2 or 4, ot3 is a "Fault", and the fault is recorded.</li> <li>1) Configure the settings for P14.78 and P14.79 again.</li> <li>2) Check for mechanical error and remove the causes of malfunction.</li> <li>3) Verify load and decrease the loading or replace with a motor with larger capacity if load is too high.</li> <li>4) Verify accel/decel time and increase the setting values for P01.12– P01.19 (accel./ decel. time) if work cycle is too short.</li> <li>5) Verify V/F voltage and adjust the V/F curve (Motor 3, P01.63–P01.70), especially the setting value for the mid-point voltage (if the mid-point voltage is set too small, the load capacity decreases at low-speed).</li> <li>6) Replace motor with a larger capacity motor.</li> <li>7) Check for overload during low-speed operation and decrease the loading during low-speed operation or increase the motor capacity.</li> <li>8) Verify torque compensation and adjust P07.75 torque compensation gain until the output current decreases and the motor does not stall.</li> <li>9) Correct the parameter settings for speed tracking. Start the speed tracking function. Adjust the maximum current for P07.09 speed tracking.</li> </ul>

Fault Codes (continued)           Display on         Fault Name and							
GS20(X) Keypad	ID No.	Fault Name and Description	Action, Reset, and Corrective Action				
EoL 3		Internal communication error (EoL3) Electronic thermal relay 3 protection. The drive coasts to stop once it activates.	Action Level Action Time	Start counting when output current > 150% of the motor 3 rated current. P14.81 (If the output current is larger than 105% of the motor 3 rated current again within 60 sec., the counting time reduces and is less than P14.81)			
			Fault setting parameter	N/A			
			Reset method Reset condition	Manual reset Reset in five seconds after the fault is cleared			
			Record	Yes			
			Corrective Actions	<ol> <li>Reduce the load.</li> <li>Increase the setting value for P01.12–P01.19 (accel./decel. time)</li> <li>Adjust the settings for P01.54–P01.61 (V/F curve), especially the setting value for the mid-point voltage (if the mid-point voltage is set too low, the load capacity decreases at low speed). Refer to the V/F curve selection of P01.43.</li> <li>If the EoL3 only occurs during low-speed operations:         <ul> <li>a) Replaced the drive with a dedicated VFD model.</li> <li>b) Increase the motor capacity.</li> </ul> </li> <li>If using a VFD dedicated motor, verify P14.80=1: Standard motor (motor with fan on the shaft).</li> <li>Verify motor rated current and reset if needed.</li> <li>If using one drive to run multiple motors, set P14.80=2: Disable, and install thermal relay on each motor.</li> <li>Set stall prevention to the proper value.</li> <li>Adjust P07.73 torque compensation gain until the current reduces and the motor does not stall.</li> <li>Check the status of the fan, or replace the fan.</li> <li>Replace the motor.</li> </ol>			
	135		Action Level Action Time	Start counting when the output current > 150% of the motor 4 rated current. P14.83 (If the output current is larger than 105% of motor 4 rated current again within 60 sec., the counting time reduces and is less than P14.83)			
			Fault setting parameter	N/A			
			Reset method	Manual reset			
			Reset condition	Reset in five seconds after the fault is cleared			
EoL4			Record Corrective Actions	<ul> <li>Yes</li> <li>1) Reduce the load.</li> <li>2) Increase the setting value for P01.12–P01.19 (accel./decel. time)</li> <li>3) Adjust the settings for P01.62–P01.70 (V/F curve), especially the setting value for the mid-point voltage (if the mid-point voltage is set too low, the load capacity decreases at low speed). Refer to the V/F curve selection of P01.43.</li> <li>4) If the EoL4 only occurs during low-speed operations: <ul> <li>a) Replaced the drive with a dedicated VFD model.</li> <li>b) Increase the motor capacity.</li> </ul> </li> <li>5) If using a VFD dedicated motor, verify P14.82=1: Standard motor (motor with fan on the shaft).</li> <li>6) Verify motor rated current and reset if needed.</li> <li>7) Verify motor rated frequency and reset if needed.</li> <li>8) If using one drive to run multiple motors, set P14.82=2: Disable, and install thermal relay on each motor.</li> <li>9) Set stall prevention to the proper value.</li> <li>10) Adjust P07.75 torque compensation gain until the current reduces and the motor does not stall.</li> <li>11) Check the status of the fan, or replace the fan.</li> <li>12) Replace the motor.</li> </ul>			

Fault Codes (continued)							
Display on GS20(X) Keypad	ID No.	Fault Name and Description	Action, Reset, and Corrective Action				
			Action Level	Hardware detection			
	140	oc hardware error (Hd6) GFF hardware protection error when power is ON. GFF occurs before run (b4GFF) The ground short circuit detected when the output wiring detection is performed before the drive runs.	Action Time	Immediately act when the fault is detected			
			parameter	N/A			
Hd6			Reset method	Power-off			
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			Reset condition				
			Record	Yes			
			Corrective	Cycle the power.			
			Actions Action Level	If Hd6 still exists, contact AutomationDirect Technical Support. 250% of the rated current			
			Action Time	Immediately act			
			Fault setting				
			parameter	N/A			
			Reset method	Manual reset			
			Reset condition	Reset in five seconds after the fault is cleared			
649FF			Record	Yes 1) Check if the motor's internal wiring and the UVW wiring of the drive			
				output terminal are correct.			
			Corrective	2) Check the motor cable and remove causes of any short circuits, or			
			Actions	replace the cable before turning on the power.			
				3) Check the motor insulation value with megger. Replace the motor if			
				the insulation is poor.			
		Auto-tune error 1 (AuE1) No feedback current error when the motor parameter automatically detects	Action Level Action Time	Software detection Immediately act			
			Fault setting				
			parameter	N/A			
AUE I	142		Reset method	Manual reset			
	142		Reset condition	Immediately reset			
			Record	Yes 1) Verify the motor is wired correctly.			
			Corrective	<ol> <li>If a contactor is used as an open state on the output side of the drive</li> </ol>			
			Actions	(U/V/W), check if the contactor coil is closed.			
			Action Level	Software detection			
	143	Auto-tune error 2 (AuE2)	Action Time	Immediately act			
			Fault setting parameter	N/A			
			Reset method	Manual reset			
AUE2			Reset condition	Immediately reset			
писс			Record	Yes			
				<ol> <li>Verify that the motor is wired correctly and no wires are broken.</li> <li>Confirm that the motor works normally outside of auto-tuning.</li> </ol>			
			Corrective	<ul><li>2) Confirm that the motor works normally outside of auto-tuning.</li><li>3) If an electromagnetic contactor is used as an open state on the</li></ul>			
			Actions	output side of the drive (U/V/W), verify that the three phases of the			
				electromagnetic valve are all closed.			
	144	Auto-tune error 3 (AuE3) No load current $I_0$ measurement error when the motor parameter automatically detects.	Action Level	Software detection			
			Action Time Fault setting	Immediately act			
			parameter	N/A			
AUE3			Reset method	Manual reset			
			Reset condition	Immediately reset			
			Record	Yes			
			Corrective Actions	<ol> <li>Check the settings for P05.01 / P05.13 / P05.34.</li> <li>Confirm that the motor works normally outside of auto-tuning.</li> </ol>			
	149	Auto-tune error 5 (AuE5) The rotor resistance	Actions Action Level	2) Confirm that the motor works normally outside of auto-tuning.			
RUES			Action Time	Immediately act			
			Fault setting	N/A			
			parameter				
			Reset method	Manual reset			
			Reset condition Record	Immediate reset Yes			
				<ol> <li>Verify that the motor is wired correctly and no wires are broken.</li> </ol>			
			Corrective Actions	2) Confirm that the motor works normally outside of auto-tuning.			
				Possibly test with standard across-the-line starter."			

# **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 GS20(X) 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 GS20(X) 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 GS20(X) 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 GS20(X) drive failure or damage as a result of wet fiber dust adhering to components within the drive.

#### Solution:

Install the GS20(X) drive in a suitable enclosure to protect it from fiber dust. Clean and remove fiber dust regularly to prevent damage to the drive.







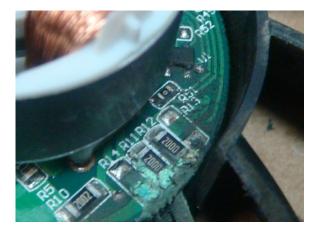
# **CORROSION PROBLEM**

Corrosion problems may occur if any fluids or liquid in vapor form flows into the GS20(X) drive. Please be aware of the damage that corrosion may cause to your drive.

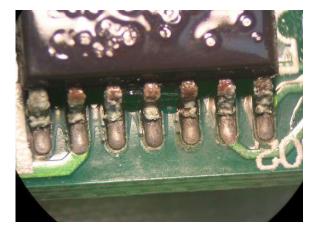
• Corrosion of internal components may cause the GS20(X) drive to malfunction and possibly explode.

# Solution:

Install the GS20(X) drive in a suitable enclosure to protect it from fluids. Clean the drive regularly to prevent corrosion.







#### INDUSTRIAL DUST PROBLEM

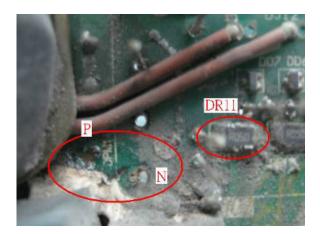
Serious industrial dust pollution frequently occurs in stone processing plants, flour mills, cement plants, and so on. Please be particularly aware of any metal dust, filings or if metalized vapor is present as these may cause damage to your drives:

- 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 GS20(X) 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 GS20(X) 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 GS20(X) 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 GS20(X) drive have been modified, components on the affected boards may have been damaged.

#### Solution:

Inspect all power and control terminal connections in the GS20(X) drive to ensure adequate wire insertion. Do not attempt to disassemble or repair control boards in the GS20(X) 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.

