

6.3 Drive Alarms, Faults, and Errors

◆ Types of Alarms, Faults, and Errors

Check the LED operator for information about possible faults if the drive or motor fails to operate. *Refer to Using the Digital LED Operator on page 56.*

If problems occur that are not covered in this manual, contact the nearest Yaskawa representative with the following information:

- Drive model
- Software version
- Date of purchase
- Description of the problem

Table 6.3 contains descriptions of the various types of alarms, faults, and errors that may occur while operating the drive. Contact Yaskawa in the event of drive failure.

Table 6.3 Types of Alarms, Faults, and Errors

Type	Drive Responses to Alarms, Faults, and Errors
Faults	<p>When the drive detects a fault:</p> <ul style="list-style-type: none"> • The digital operator displays text that indicates the specific fault and the ALM indicator LED remains lit until the fault is reset. • The fault interrupts drive output and the motor coasts to a stop. • Depending on the setting, the drive and motor may stop via different methods than listed. • If a digital output is programmed for fault output (H2-01 = E), it will close if a fault occurs. <p>When the drive detects a fault, it will remain inoperable until that fault has been reset. <i>Refer to Fault Reset Methods on page 139.</i></p>
Minor Faults and Alarms	<p>When the drive detects an alarm or a minor fault:</p> <ul style="list-style-type: none"> • The digital operator displays text that indicates the specific alarm or minor fault and the ALM indicator LED flashes. • The motor does not stop. • The multi-function contact output closes if set to be tripped by a minor fault (H2-01 = 10), but not by an alarm. • The digital operator displays text indicating a specific alarm and ALM indicator LED flashes. <p>Remove the cause of an alarm or minor fault to automatically reset.</p>
Operation Errors	<p>When parameter settings conflict with one another or do not match hardware settings (such as with an option unit), it results in an operation error.</p> <p>When the drive detects an operation error:</p> <ul style="list-style-type: none"> • The digital operator displays text that indicates the specific error. • The multi-function contact output does not operate. <p>When the drive detects an operation error, it will not operate the motor until the error has been reset. Correct the settings that caused the operation error to reset.</p>

◆ Alarm and Error Displays

■ Faults

When the drive detects a fault, the ALM indicator LEDs remain lit without flashing. If the LEDs flash, the drive has detected a minor fault or alarm. *Refer to Minor Faults and Alarms on page 128* for more information. Conditions such as overvoltage or external faults can trip both faults and minor faults, therefore it is important to note whether the LEDs remain lit or if the LEDs flash.

Table 6.4 Fault Displays

LED Operator Display	Name	Page	LED Operator Display	Name	Page	
\overline{EE}	CE	129	$\overline{CPF20}$ or $\overline{CPF21}$	RAM Fault	129	
\overline{CoF}	CoF	129		FLASH Memory Fault	129	
$\overline{CPF00}$ or $\overline{CPF01}$	CPF00 or CPF01 <1>	129		Watchdog Circuit Exception	129	
		CPF11 – RAM Fault		129	Clock Fault	129
		CPF12 – FLASH Memory Fault	129			
		CPF14 – Control Circuit Fault	129			
		129	$\overline{CPF22}$	CPF22	A/D Conversion Error	130
		129	$\overline{CPF23}$	CPF23	PWM Feedback Data Fault	130
		129	$\overline{CPF24}$	CPF24	Drive Capacity Signal Fault	130
$\overline{CPF02}$	CPF02	129	$\overline{EF0}$	EF0	Option Unit External Fault	130
$\overline{CPF06}$	CPF06	129	$\overline{EF1}$ to $\overline{EF5}$	EF1 to EF5	External Fault (input terminal S1 to S5)	130
$\overline{CPF08}$	CPF08	129	\overline{Err}	Err	EEPROM Write Error	130
			\overline{oC}	oC	Overcurrent	130
			$\overline{oFA01}$	oFA01	Option Disconnected	131
			$\overline{oH1}$	oH1	Heatsink Overheat	131

6.3 Drive Alarms, Faults, and Errors

LED Operator Display	Name	Page
<i>oL1</i>	oL1	Motor Overload 131
<i>oL2</i>	oL2	Drive Overload 132
<i>oL3</i>	oL3	Overtorque Detection 1 132
<i>oPr</i>	oPr	Operator Connection Fault 132
<i>ov</i>	ov	Overvoltage 136

LED Operator Display	Name	Page
<i>PF</i>	PF	Input Phase Loss 133
<i>rH</i>	rH	Dynamic Braking Resistor 133
<i>Uv1</i>	Uv1	Undervoltage 133
<i>Uv3</i>	Uv3	Soft Charge Circuit Fault 134

<1> Displayed as *CPFD0* when occurring at drive power up. When one of the faults occurs after successfully starting the drive, the display will show *CPFD1*.

<2> Displayed as *CPFD0* when occurring at drive power up. When one of the faults occurs after successfully starting the drive, the display will show *CPFD1*.

■ Minor Faults and Alarms

When a minor fault or alarm occurs, the ALM LED flashes and the text display shows an alarm code. A fault has occurred if the text remains lit and does not flash. *Refer to Alarm Detection on page 135*. An overvoltage situation, for example, can trigger both faults and minor faults. It is therefore important to note whether the LEDs remain lit or if the LEDs flash.

Table 6.5 Minor Fault and Alarm Displays

LED Operator Display	Name	Minor Fault Output (H2-01 = 10)	Page
<i>bb</i>	bb	Drive Baseblock	No output 135
<i>CALL</i>	CALL	Serial Communication Transmission Error	YES 135
<i>CE</i>	CE	MEMOBUS/Modbus Communication Error	YES 135
<i>CrST</i>	CrST	Can Not Reset	YES 135
<i>EF</i>	EF	Run Command Input Error	YES 135
<i>EF1 to EF5</i>	EF1 to EF5	External Fault (input terminal S1 to S5)	YES 136
<i>oH</i>	oH	Heatsink Overheat	YES 136
<i>oL3</i>	oL3	Overtorque 1	YES 136
<i>ov</i>	ov	Overvoltage	YES 136
<i>PASS</i>	PASS	MEMOBUS/Modbus Test Mode Complete	No output 137
<i>SE</i>	SE	MEMOBUS/Modbus Test Mode Fault	YES 137
<i>Uv</i>	Uv	Undervoltage	YES 137

■ Operation Errors

Table 6.6 Operation Error Displays

LED Operator Display	Name	Page	LED Operator Display	Name	Page
<i>oPE01</i>	oPE01	Drive Unit Setting Error 138	<i>oPE05</i>	oPE05	Run Command Selection Error 138
<i>oPE02</i>	oPE02	Parameter Setting Range Error 138	<i>oPE10</i>	oPE10	V/f Data Setting Error 138
<i>oPE03</i>	oPE03	Multi-Function Input Setting Error 138	<i>oPE11</i>	oPE11	Carrier Frequency Setting Error 138


6.4 Fault Detection

◆ Fault Displays, Causes and Possible Solutions

Table 6.7 Detailed Fault Displays, Causes and Possible Solutions

LED Operator Display		Fault Name
\overline{CE}	CE	MEMOBUS/Modbus Communication Error No data was received for longer than 2 seconds.
Cause		Possible Solution
Faulty communications wiring, or a short circuit exists.		<ul style="list-style-type: none"> • Check for faulty wiring. • Correct the wiring. • Check for loose wiring and short circuits. Repair as needed.
A communications data error occurred due to noise.		<ul style="list-style-type: none"> • Check the various options available to minimize the effects of noise. • Counteract noise in control circuit, main circuit, and ground wiring. • Use Yaskawa-recommended cables, or another type of shielded line. Ground the shield on the controller side or on the drive input power side. • Ensure that other equipment such as switches or relays do not cause noise and use surge suppressors if required. • Separate all wiring for communications devices from drive input power lines. Install a noise filter to the input side of the drive input power.
LED Operator Display		Fault Name
\overline{CoF}	CoF	Current Offset Fault There is a problem with the current detection circuit.
Cause		Possible Solution
While the drive automatically adjusted the current offset, the calculated value exceeded the allowable setting range.		Replace the drive.
LED Operator Display		Fault Name
$\overline{CPF00}$ or $\overline{CPF01}$	CPF00 or CPF01	CPF11 – RAM Fault CPF12 – Problem with the ROM (FLASH memory) CPF14 – CPU error (CPU operates incorrectly due to noise, etc.) CPF17 – A timing error occurred during an internal process CPF18 – CPU error (CPU operates incorrectly due to noise, etc.)
Cause		Possible Solution
Hardware is damaged.		Replace the drive.
LED Operator Display		Fault Name
$\overline{CPF02}$	CPF02	A/D Conversion Error An A/D conversion error occurred.
Cause		Possible Solution
Control circuit is damaged.		Cycle power to the drive. If the problem continues, replace the drive.
Control circuit terminals have shorted out (+V, AC).		<ul style="list-style-type: none"> • Check for wiring errors along the control circuit terminals. • Correct the wiring.
Control terminal input current has exceeded allowable levels.		Check the resistance of the speed potentiometer and related wiring.
		<ul style="list-style-type: none"> • Check the input current. • Reduce the current input to control circuit terminal (+V) to 20 mA.
LED Operator Display		Fault Name
$\overline{CPF06}$	CPF06	EEPROM Data Error There is an error in the data saved to EEPROM.
Cause		Possible Solution
Control circuit is damaged.		Cycle power to the drive. If the problem continues, replace the drive.
The power supply was switched off when parameters were written (e.g., using an option unit).		Reinitialize the drive (A1-03).
LED Operator Display		Fault Name
$\overline{CPF08}$	CPF08	EEPROM Communication Fault EEPROM communications are not functioning properly.
Cause		Possible Solution
Control circuit is damaged.		Cycle power to the drive. If the problem persists, replace the drive.
LED Operator Display		Fault Name
$\overline{CPF20}$ or $\overline{CPF21}$	CPF20 or CPF21	One of the following faults occurred: RAM fault, FLASH memory error, watchdog circuit exception, clock error <ul style="list-style-type: none"> • RAM fault. • FLASH memory error (ROM error). • Watchdog circuit exception (self-diagnostic error). • Clock error.

6.4 Fault Detection

Cause		Possible Solution
Hardware is damaged.		Replace the drive.
LED Operator Display		Fault Name
CPF22	CPF22	A/D Conversion Fault A/D conversion error.
Cause		Possible Solution
Control circuit is damaged.		<ul style="list-style-type: none"> • Cycle power to the drive. <i>Refer to Diagnosing and Resetting Faults on page 139.</i> • If the problem continues, replace the drive.
LED Operator Display		Fault Name
CPF23	CPF23	PWM Feedback Fault PWM feedback error.
Cause		Possible Solution
Hardware is damaged.		Replace the drive.
LED Operator Display		Fault Name
CPF24	CPF24	Drive Capacity Signal Fault Entered a capacity that does not exist. (Checked when the drive is powered up.)
Cause		Possible Solution
Hardware is damaged.		Replace the drive.
LED Operator Display		Fault Name
EF0	EF0	MEMOBUS/Modbus Communication External Fault An external fault condition is present.
Cause		Possible Solution
An external fault was received from the PLC with other than H5-04 = 3 “alarm only” (the drive continued to run after external fault).		<ul style="list-style-type: none"> • Remove the cause of the external fault. • Remove the external fault input from the PLC.
Problem with the PLC program.		Check the PLC program and correct problems.
LED Operator Display		Fault Name
EF1	EF1	External Fault (input terminal S1) External fault at multi-function input terminal S1.
EF2	EF2	External Fault (input terminal S2) External fault at multi-function input terminal S2.
EF3	EF3	External Fault (input terminal S3) External fault at multi-function input terminal S3.
EF4	EF4	External Fault (input terminal S4) External fault at multi-function input terminal S4.
EF5	EF5	External Fault (input terminal S5) External fault at multi-function input terminal S5.
Cause		Possible Solution
An external device has tripped an alarm function.		Remove the cause of the external fault and reset the fault.
Wiring is incorrect.		<ul style="list-style-type: none"> • Ensure the signal lines have been connected properly to the terminals assigned for external fault detection (H1-□□ = 20 to 2F). • Reconnect the signal line.
Incorrect setting of multi-function contact inputs.		<ul style="list-style-type: none"> • Check if the unused terminals set for H1-□□ = 20 to 2F (External Fault). • Change the terminal settings.
LED Operator Display		Fault Name
Err	Err	EEPROM Write Error Data does not match the EEPROM being written to.
Cause		Possible Solution
-		<ul style="list-style-type: none"> • Press the  button. • Correct the parameter settings. • Cycle power to the drive. <i>Refer to Diagnosing and Resetting Faults on page 139.</i>
LED Operator Display		Fault Name
oC	oC	Overcurrent Drive sensors have detected an output current greater than the specified overcurrent level.
Cause		Possible Solution
The motor has been damaged due to overheating or the motor insulation is damaged.		<ul style="list-style-type: none"> • Check the insulation resistance. • Replace the motor.
One of the motor cables has shorted out or there is a grounding problem.		<ul style="list-style-type: none"> • Check the motor cables. • Remove the short circuit and power the drive back up. • Check the resistance between the motor cables and the ground terminalⓄ. • Replace damaged cables.

The load is too heavy.	<ul style="list-style-type: none"> • Measure the current flowing into the motor. • Replace the drive with a larger capacity unit if the current value exceeds the rated current of the drive. • Determine if there is sudden fluctuation in the current level. • Reduce the load to avoid sudden changes in the current level or switch to a larger drive.
The acceleration or deceleration times are too short.	<p>Calculate the torque needed during acceleration relative to the load inertia and the specified acceleration time.</p> <p>If the right amount of torque cannot be set, make the following changes:</p> <ul style="list-style-type: none"> • Increase the acceleration time (C1-01, -03) • Increase the S-curve characteristics (C2-01 through C2-04) • Increase the capacity of the drive.
The drive is attempting to operate a specialized motor or a motor larger than the maximum size allowed.	<ul style="list-style-type: none"> • Check the motor capacity. • Ensure that the rated capacity of the drive is greater than or equal to the capacity rating found on the motor nameplate.
Magnetic contactor (MC) on the output side of the drive has turned on or off.	Set up the operation sequence so that the MC is not tripped while the drive is outputting current.
V/f setting is not operating as expected.	<ul style="list-style-type: none"> • Check the ratios between the voltage and frequency. • Set parameter E1-04 through E1-10 appropriately. • Lower the voltage if it is too high relative to the frequency.
Excessive torque compensation.	<ul style="list-style-type: none"> • Check the amount of torque compensation. • Reduce the torque compensation gain (C4-01) until there is no speed loss and less current.
Drive fails to operate properly due to noise interference.	<ul style="list-style-type: none"> • Review the possible solutions provided for handling noise interference. • Review the section on handling noise interference and check the control circuit lines, main circuit lines and ground wiring.
Overexcitation gain is set too high.	<ul style="list-style-type: none"> • Check if fault occurs simultaneously to overexcitation function operation. • Consider motor flux saturation and reduce the value of n3-13 (Overexcitation Deceleration Gain).
Run command applied while motor was coasting.	<ul style="list-style-type: none"> • Program the Speed Search command input through one of the multi-function contact input terminals (H1-□□ = "61" or "62").
The motor cable is too long	Use a larger drive.
LED Operator Display	
Fault Name	
<i>oFRQ1</i>	oFA01
Option Unit Fault	
Replace the option unit.	
Cause	
Possible Solution	
The option unit is not properly connected to the drive.	
Turn the power off and reconnect the option unit.	
LED Operator Display	
Fault Name	
<i>oH1</i>	oH1
Overheat 1 (Heatsink Overheat)	
The temperature of the heatsink has exceeded the overheat detection level.	
Cause	
Possible Solution	
Surrounding temperature is too high.	
<ul style="list-style-type: none"> • Check the temperature surrounding the drive. • Improve the air circulation within the enclosure panel. • Install a fan or air conditioner to cool the surrounding area. • Remove anything near the drive that might be producing excessive heat. 	
Load is too heavy.	
<ul style="list-style-type: none"> • Measure the output current. • Lower the carrier frequency (C6-02). • Reduce the load. 	
Current flowing to control circuit terminal +V exceeded the tolerance level.	
<ul style="list-style-type: none"> • Check the current level of the terminal. • Set the current to the control circuit terminal to be 20 mA or less. 	
LED Operator Display	
Fault Name	
<i>oL1</i>	oL1
Motor Overload	
The electrothermal sensor tripped overload protection.	
Cause	
Possible Solution	
Load is too heavy.	
Reduce the load.	
Cycle times are too short during acceleration and deceleration.	
Increase the acceleration and deceleration times (C1-01 through C1-04).	
<ul style="list-style-type: none"> • Drive overloaded at low speeds. • Overload may occur at low speeds when using a general-purpose motor, even if operating within the rated current limitation. 	
<ul style="list-style-type: none"> • Reduce the load. • Increase the speed. • If the drive is supposed to operate at low speeds, either increase the motor capacity or use a motor specifically designed to operate with the drive. 	
Although a special type of motor is being used, the motor protection selection is set for a general-purpose motor (L1-01 = 1).	
Set L1-01 = "2".	
Voltage is too high for the V/f characteristics.	
<ul style="list-style-type: none"> • Adjust the user set V/f patterns (E1-04 through E1-10). Parameters E1-08 and E1-10 may need to be reduced. • If E1-08 and E1-10 are set too high, there may be very little load tolerance at low speed. 	
The wrong motor-rated current is set to E2-01.	
<ul style="list-style-type: none"> • Check the motor-rated current. • Enter the value written on the motor nameplate to parameter E2-01. 	
The maximum frequency for the drive input power is set too low.	
<ul style="list-style-type: none"> • Check the rated frequency indicated on the motor nameplate. • Enter the rated frequency to E1-06 (Base Frequency). 	

6.4 Fault Detection

Multiple motors are running off the same drive.	Disable the Motor Protection function (L1-01 = "0") and install a thermal relay to each motor.
The electrical thermal protection characteristics and motor overload characteristics do not match.	<ul style="list-style-type: none"> • Check the motor characteristics. • Correct the value set to L1-01 (Motor Protection Function). • Install an external thermal relay.
The electrical thermal relay is operating at the wrong level.	<ul style="list-style-type: none"> • Check the current rating listed on the motor nameplate. • Check the value set for the motor-rated current (E2-01).
Motor overheated by overexcitation operation.	<ul style="list-style-type: none"> • Overexcitation increases the motor losses and thereby the motor temperature. If applied too long, motor damage can occur. Prevent excessive overexcitation operation or apply proper cooling to the motor. • Reduce the excitation deceleration gain (n3-13). • Set L3-04 (Stall Prevention during Deceleration) to a value other than 4.
Output current fluctuation due to input phase loss	Check the power supply for phase loss.
LED Operator Display	
Fault Name	
oL2	oL2
Drive Overload	
The thermal sensor of the drive triggered overload protection.	
Cause	
Possible Solution	
Load is too heavy.	Reduce the load.
Cycle times are too short during acceleration and deceleration.	Increase the settings for the acceleration and deceleration times (C1-01 through C1-04).
Voltage is too high for the V/f characteristics.	<ul style="list-style-type: none"> • Adjust the preset V/f pattern (E1-04 through E1-10). This will mainly involve reducing E1-08 and E1-10. • Be careful not to lower E1-08 and E1-10 excessively because this reduces load tolerance at low speeds.
Drive capacity is too small.	Replace the drive with a larger model.
Overload occurred when operating at low speeds.	<ul style="list-style-type: none"> • Reduce the load when operating at low speeds. • Replace the drive with a model that is one frame size larger. • Lower the carrier frequency (C6-02).
Excessive torque compensation.	Reduce the torque compensation gain (C4-01) until there is no speed loss but less current.
Output current fluctuation due to input phase loss	Check the power supply for phase loss.
LED Operator Display	
Fault Name	
oL3	oL3
Overtorque Detection 1	
The current has exceeded the value set for torque detection (L6-02) for longer than the allowable time (L6-03).	
Cause	
Possible Solution	
Parameter settings are not appropriate for the type of load.	Check the settings of parameters L6-02 and L6-03.
There is a fault on the machine side (e.g., the machine is locked up).	Check the status of the load. Remove the cause of the fault.
LED Operator Display	
Fault Name	
oPr	oPr
External Digital Operator Connection Fault	
The external operator has been disconnected from the drive.	
Note: An oPr fault will occur when both of the following conditions are true:	
<ul style="list-style-type: none"> • Output is interrupted when the operator is disconnected (o2-06 = 1) • The run command is assigned to the operator (b1-02 = 0 and LOCAL has been selected) 	
Cause	
Possible Solution	
External operator is not properly connected to the drive.	<ul style="list-style-type: none"> • Check the connection between the operator and the drive • Replace the cable if damaged • Turn off the drive input power and disconnect the operator. Next reconnect the operator and turn the drive input power back on.
LED Operator Display	
Fault Name	
ov	ov
Overvoltage	
Voltage in the DC bus has exceeded the overvoltage detection level.	
<ul style="list-style-type: none"> • For 200 V class: approximately 410 V • For 400 V class: approximately 820 V (740 V when E1-01 is less than 400) 	
Cause	
Possible Solution	
Deceleration time is too short and regenerative energy flows from the motor into the drive.	<ul style="list-style-type: none"> • Increase the deceleration time (C1-02, -04). • Install a braking resistor or a dynamic braking resistor unit. • Enable stall prevention during deceleration (L3-04 = "1"). Stall prevention is enabled as the default setting.
Excessive braking load.	The braking torque was too high, causing regenerative energy to charge the DC bus. Reduce the braking torque, use a braking option, or lengthen decel time.
Surge voltage entering from the drive input power.	Install a DC reactor. Note: Voltage surge can result from thyristor convertor and phase advancing capacitor using same drive main input power supply.
Ground fault in the output circuit causing the DC bus capacitor to overcharge.	<ul style="list-style-type: none"> • Check the motor wiring for ground faults. • Correct grounding shorts and turn the power back on.
Excessive regeneration when overshoot occurs after acceleration.	<ul style="list-style-type: none"> • Lengthen the S-curve at acceleration end.

Drive input power voltage is too high.	<ul style="list-style-type: none"> • Check the voltage. • Lower drive input power voltage within the limits listed in the specifications.
The dynamic braking transistor is damaged.	Replace the drive.
The braking transistor is wired incorrectly.	<ul style="list-style-type: none"> • Check braking transistor wiring for errors. • Properly rewire the braking resistor device.
Drive fails to operate properly due to noise interference.	<ul style="list-style-type: none"> • Review the list of possible solutions provided for controlling noise. • Review the section on handling noise interference and check the control circuit lines, main circuit lines and ground wiring.
Motor hunting occurs.	<ul style="list-style-type: none"> • Adjust the parameters that control hunting. • Set the hunting prevention gain (n1-02).
LED Operator Display	
Fault Name	
Pf	PF
Input Phase Loss	
Drive input power has an open phase or has a large imbalance of voltage between phases. Detected when L8-05 = 1 (enabled).	
Cause	
Possible Solution	
There is phase loss in the drive input power.	<ul style="list-style-type: none"> • Check for wiring errors in the main circuit drive input power. • Correct the wiring.
There is loose wiring in the drive input power terminals.	<ul style="list-style-type: none"> • Ensure the terminals are tightened properly. • Apply the tightening torque specified in this manual to fasten the terminals. <i>Refer to Wire Gauges and Tightening Torque on page 39</i>
There is excessive fluctuation in the drive input power voltage.	<ul style="list-style-type: none"> • Check the voltage from the drive input power. • Review the possible solutions for stabilizing the drive input power. • Disable Input Phase Loss Detection (L8-05 = "0"). PF is detected if DC bus ripple is too high. If it is disabled, there is no fault but the ripple is still too high, thereby the capacitors are stressed more and lose lifetime.
There is poor balance between voltage phases.	<ul style="list-style-type: none"> • Stabilize drive input power or disable phase loss detection.
The main circuit capacitors are worn.	<ul style="list-style-type: none"> • Check the maintenance time for the capacitors (U4-05). • Replace the drive if U4-05 is greater than 90%.
	<ul style="list-style-type: none"> • Check for anything wrong with the drive input power. • If nothing is wrong with the drive input power, try the following solutions if the alarm continues: • Disable Input Phase Loss Protection selection (L8-05 = "0"). PF is detected if DC bus ripple is too high. If it is disabled, there is no fault but the ripple is still too high, thereby the capacitors are stressed more and lose lifetime. • Replace the drive.
LED Operator Display	
Fault Name	
rH	rH
Braking Resistor Overheat	
Braking resistor protection was triggered.	
Fault detection is enabled when L8-01 = 1 (disabled as a default).	
Note: The magnitude of the braking load trips the braking resistor overheat alarm, NOT the surface temperature. Using the braking resistor more frequently than its rating trips the alarm even when the braking resistor surface is not very hot.	
Cause	
Possible Solution	
Deceleration time is too short and excessive regenerative energy is flowing back into the drive.	<ul style="list-style-type: none"> • Check the load, deceleration time and speed. • Reduce the load. • Increase the acceleration and deceleration times (C1-01 through C1-04). • Replace the braking option with a larger device that can handle the power that is discharged.
Excessive braking inertia.	Recalculate braking load and braking power. Then try reducing the braking load and checking the braking resistor settings and improve braking capacity.
The proper braking resistor has not been installed.	<ul style="list-style-type: none"> • Check the specifications and conditions for the braking resistor device. • Select the optimal braking resistor.
LED Operator Display	
Fault Name	
$Uv1$	Uv1
DC Bus Undervoltage	
One of the following conditions occurred while the drive was stopped:	
<ul style="list-style-type: none"> • Voltage in the DC bus fell below the undervoltage detection level. • For 200 V class: approximately 190 V (160 V for single phase drives) • For 400 V class: approximately 380 V (350 V when E1-01 is less than 400) The fault is output only if L2-01 = 0 or the DC bus voltage is below the Uv detection level for a certain time while L2-01 = 1. 	
Cause	
Possible Solution	
Input power phase loss.	<ul style="list-style-type: none"> • The main circuit drive input power is wired incorrectly. • Correct the wiring.
One of the drive input power wiring terminals is loose.	<ul style="list-style-type: none"> • Ensure there are no loose terminals. • Apply the tightening torque specified in this manual to fasten the terminals. <i>Refer to Wire Gauges and Tightening Torque on page 39</i>
There is a problem with the voltage from the drive input power.	<ul style="list-style-type: none"> • Check the voltage. • Correct the voltage to within range listed in drive input power specifications.
The power has been interrupted.	Correct the drive input power.
Drive internal circuitry has become worn.	<ul style="list-style-type: none"> • Check the maintenance time for the capacitors (U4-05). • Replace the drive if U4-05 exceeds 90%.

6.4 Fault Detection

The drive input power transformer is not large enough and voltage drops after switching on power.		Check the capacity of the drive input power transformer.
Air inside the drive is too hot.		Check the drive internal temperature.
Problem with the CHARGE indicator.		Replace the drive.
LED Operator Display		Fault Name
$Uu3$	Uv3	Undervoltage 3 (Inrush Prevention Circuit Fault)
		The inrush prevention circuit has failed.
Cause		Possible Solution
The contactor on the inrush prevention circuit is damaged.		<ul style="list-style-type: none"> • Cycle power to the drive. Check if the fault reoccurs. • Replace the drive if the fault continues to occur. • Check monitor U4-06 for the performance life of the inrush prevention circuit. • Replace the drive if U4-06 exceeds 90%.

6.5 Alarm Detection

Alarms are drive protection functions that do not operate the fault contact. The drive will return to original status when the cause of the alarm has been removed.

During an alarm condition, the Digital Operator display flashes and an alarm output is generated at the multi-function output (H2-01), if programmed.

Investigate the cause of the alarm and refer to [Table 6.8](#) for the appropriate action.

◆ Alarm Codes, Causes, and Possible Solutions

Table 6.8 Alarm Codes, Causes, and Possible Solutions

LED Operator Display		Minor Fault Name	
<i>bb</i>	bb	Baseblock Drive output interrupted as indicated by an external baseblock signal.	
Cause		Possible Solutions	Minor Fault (H2-01 = 10)
External baseblock signal entered via multi-function input terminal (S1 to S5).		Check external sequence and baseblock signal input timing.	No output
LED Operator Display		Minor Fault Name	
<i>CALL</i>	CALL	Serial Communication Transmission Error Communication has not yet been established.	
Cause		Possible Solutions	Minor Fault (H2-01 = 10)
Communications wiring is faulty, there is a short circuit, or something is not connected properly.		<ul style="list-style-type: none"> • Check for wiring errors. • Correct the wiring. • Remove and ground shorts and reconnect loose wires. 	YES
Programming error on the master side.		Check communications at start-up and correct programming errors.	YES
Communications circuitry is damaged.		<ul style="list-style-type: none"> • Perform a self-diagnostics check. • Replace the drive if the fault continues to occur. 	YES
Terminal resistance setting is incorrect.		The terminal slave drive must have the internal terminal resistance switch set correctly. Place DIP switch S2 to the ON position.	YES
LED Operator Display		Minor Fault Name	
<i>EE</i>	CE	MEMOBUS/Modbus Communication Error Control data was not received correctly for two seconds.	
Cause		Possible Solutions	Minor Fault (H2-01 = 10)
A data error occurred due to noise.		<ul style="list-style-type: none"> • Check options available to minimize the effects of noise. • Counteract noise in the control circuit wiring, main circuit lines and ground wiring. • Reduce noise on the controller side. • Use surge absorbers on magnetic contactors or other equipment causing the disturbance. • Use cables recommended by Yaskawa or another type of shielded line. The shield should be grounded on the controller side or on the drive input power side. • Separate all wiring for communications devices from drive input power lines. Install a noise filter to the input side of the drive input power. 	YES
Communication protocol is incompatible.		<ul style="list-style-type: none"> • Check the H5 parameter settings as well as the protocol setting in the controller. • Ensure settings are compatible. 	YES
The communication cycle is longer than 2 seconds.		<ul style="list-style-type: none"> • Check the PLC. • Change the software settings in the PLC. 	YES
Incompatible PLC software settings or there is a hardware problem.		<ul style="list-style-type: none"> • Check the PLC. • Remove the cause of the error on the controller side. 	YES
Communications cable is disconnected or damaged.		<ul style="list-style-type: none"> • Check the connector for a signal through the cable. • Replace the communications cable. 	YES
LED Operator Display		Minor Fault Name	
<i>CrST</i>	CrST	Can Not Reset	
Cause		Possible Solutions	Minor Fault Output (H2-01 = 10)
Fault reset was being executed when a run command was entered.		<ul style="list-style-type: none"> • Ensure that a run command cannot be entered from the external terminals or option unit during fault reset. • Turn off the run command. 	YES
LED Operator Display		Minor Fault Name	
<i>EF</i>	EF	Forward/Reverse Run Command Input Error Both forward run and reverse run closed simultaneously for over 0.5 s.	

6.5 Alarm Detection

Cause		Possible Solutions	Minor Fault Output (H2-01 = 10)
Sequence error		Check the forward and reverse command sequence and correct the problem. Note: When minor fault EF detected, motor ramps to stop.	YES
LED Operator Display		Minor Fault Name	
EF1	EF1	External fault (input terminal S1) External fault at multi-function input terminal S1.	
EF2	EF2	External fault (input terminal S2) External fault at multi-function input terminal S2.	
EF3	EF3	External fault (input terminal S3) External fault at multi-function input terminal S3.	
EF4	EF4	External fault (input terminal S4) External fault at multi-function input terminal S4.	
EF5	EF5	External fault (input terminal S5) External fault at multi-function input terminal S5.	
Cause		Possible Solutions	Minor Fault Output (H2-01 = 10)
An external device has tripped an alarm function.		Remove the cause of the external fault and reset the multi-function input value.	YES
Wiring is incorrect.		<ul style="list-style-type: none"> Ensure the signal lines have been connected properly to the terminals assigned for external fault detection (H1-□□ = 20 to 2F). Reconnect the signal line. 	YES
Multi-function contact inputs are set incorrectly.		<ul style="list-style-type: none"> Check if the unused terminals have been set for H1-□□ = 20 to 2F (External Fault). Change the terminal settings. 	YES
LED Operator Display		Minor Fault Name	
oH	oH	Heatsink Overheat The temperature exceeded 90-100 °C	
Cause		Possible Solutions	Minor Fault Output (H2-01 = 10)
Surrounding temperature is too high		<ul style="list-style-type: none"> Check the surrounding temperature. Improve the air circulation within the enclosure panel. Install a fan or air conditioner to cool surrounding area. Remove anything near drive that may cause extra heat. 	YES
Internal cooling fan has stopped.		<ul style="list-style-type: none"> Replace the cooling fan. <i>Refer to Cooling Fan Replacement on page 151.</i> After replacing the drive, reset the cooling fan maintenance parameter to (o4-03 = "0"). 	YES
Airflow around the drive is restricted.		<ul style="list-style-type: none"> Provide proper installation space around the drive as indicated in the manual. <i>Refer to Correct Installation Orientation on page 27.</i> Allow for the specified space and ensure that there is sufficient circulation around the control panel. 	YES
		<ul style="list-style-type: none"> Check for dust or foreign materials clogging cooling fan. Clear debris caught in the fan that restricts air circulation. 	YES
LED Operator Display		Minor Fault Name	
oL3	oL3	Overtorque 1 Drive output current was greater than L6-02 for longer than the time set in L6-03.	
Cause		Possible Solutions	Minor Fault Output (H2-01 = 10)
Inappropriate parameter settings.		Check parameters L6-02 and L6-03.	YES
There is a fault on the machine side (e.g., the machine is locked up).		<ul style="list-style-type: none"> Check the status of the machine. Remove the cause of the fault. 	YES
LED Operator Display		Minor Fault Name	
ov	ov	DC Bus Overvoltage The DC bus voltage exceeded the trip point. For 200 V class: approximately 410 V For 400 V class: approximately 820 V (740 V when E1-01 < 400)	
Cause		Possible Solutions	Minor Fault Output (H2-01 = 10)
Surge voltage present in the drive input power.		<ul style="list-style-type: none"> Install a DC reactor or an AC reactor. Voltage surge can result from a thyristor convertor and a phase advancing capacitor operating on the same drive input power system. 	YES
<ul style="list-style-type: none"> The motor is short-circuited. Ground current has over-charged the main circuit capacitors via the drive input power. 		<ul style="list-style-type: none"> Check the motor power cable, relay terminals and motor terminal box for short circuits. Correct grounding shorts and turn the power back on. 	YES

Noise interference causes the drive to operate incorrectly.		<ul style="list-style-type: none"> Review possible solutions for handling noise interference. Review section on handling noise interference and check control circuit lines, main circuit lines and ground wiring. If the magnetic contactor is identified as a source of noise, install a surge protector to the MC coil. 	YES
		Set number of fault restarts (L5-01) to a value other than 0.	YES
LED Operator Display		Minor Fault Name	
PASS	PASS	MEMOBUS/Modbus Communication Test Mode Complete	
Cause		Possible Solutions	Minor Fault Output (H2-01 = 10)
MEMOBUS/Modbus test has finished normally.		This verifies that the test was successful.	No output
LED Operator Display		Minor Fault Name	
SE	SE	MEMOBUS/Modbus Communication Test Mode Error	
Cause		Possible Solutions	Minor Fault Output (H2-01 = 10)
A digital input programmed to 67H (MEMOBUS/Modbus test) was closed while the drive was running.		Stop the drive and run the test again.	No output
LED Operator Display		Minor Fault Name	
Uv	Uv	Undervoltage One of the following conditions was true when the drive was stopped and a run command was entered: <ul style="list-style-type: none"> DC bus voltage dropped below the under voltage detection level. Contactor to suppress inrush current in the drive was open. Low voltage in the control drive input power. This alarm outputs only if L2-01 is not 0 and DC bus voltage is below the detection level. 	
Cause		Possible Solutions	Minor Fault Output (H2-01 = 10)
Phase loss in the drive input power.		Check for wiring errors in the main circuit drive input power. Correct the wiring.	YES
Loose wiring in the drive input power terminals.		<ul style="list-style-type: none"> Ensure the terminals have been properly tightened. Apply the tightening torque specified in this manual to fasten the terminals. <i>Refer to Wire Gauges and Tightening Torque on page 39</i> 	YES
There is a problem with the drive input power voltage.		<ul style="list-style-type: none"> Check the voltage. Lower the voltage of the drive input power so that it is within the limits listed in the specifications. 	YES
Drive internal circuitry is worn.		<ul style="list-style-type: none"> Check the maintenance time for the capacitors (U4-05). Replace the drive if U4-05 exceeds 90%. 	YES
The drive input power transformer is not large enough and voltage drops when the power is switched on.		<ul style="list-style-type: none"> Check for a tripped alarm when the magnetic contactor, line breaker and leakage breaker are turned on. Check the capacity of the drive input power transformer. 	YES
Air inside the drive is too hot.		<ul style="list-style-type: none"> Check the temperature inside the drive. 	YES
The CHARGE indicator light is broken or disconnected.		<ul style="list-style-type: none"> Replace the drive. 	YES

6.6 Operator Programming Errors

An Operator Programming Error (oPE) occurs when an inappropriate parameter is set or an individual parameter setting is inappropriate.

The drive will not operate until the parameter is set correctly; however, no alarm or fault outputs will occur. If an oPE occurs, investigate the cause and *Refer to oPE Codes, Causes, and Possible Solutions on page 138* for the appropriate action.

◆ oPE Codes, Causes, and Possible Solutions

Table 6.9 oPE Codes, Causes, and Possible Solutions

LED Operator Display		Error Name
oPE01	oPE01	Drive Capacity Setting Fault
Cause		Possible Solutions
The drive capacity setting (o2-04) and the actual capacity of the drive are not the same.		Drive capacity and then value set to o2-04 do not match. Correct the value set to o2-04.
LED Operator Display		Error Name
oPE02	oPE02	Parameter Range Setting Error
Cause		Possible Solutions
Parameters were set outside the possible setting range.		Set parameters to the proper values.
Note: Other errors are given precedence over oPE02 when multiple errors occur at the same time.		
LED Operator Display		Error Name
oPE03	oPE03	Multi-Function Input Selection Error
Cause		Possible Solutions
<ul style="list-style-type: none"> The same function is assigned to two multi-function inputs. Excludes “Not used” and “External Fault.” 		<ul style="list-style-type: none"> Ensure all multi-function inputs are assigned to different functions. Re-enter the multi-function settings to ensure this does not occur.
The Up command was set but the Down command was not, or vice versa (settings 10 vs. 11).		Correctly set functions that need to be enabled in combination with other functions.
Run command for a 2-Wire sequence was set, but forward/reverse command for a 2-Wire sequence was not.		Correctly set functions that need to be enabled in combination with other functions.
The following two functions are set at the same time: <ul style="list-style-type: none"> Up/Down Command (10 vs. 11) Hold Accel/Decel Stop (A) 		<ul style="list-style-type: none"> Check if contradictory settings have been assigned to the multi-function input terminals at the same time. Correct setting errors.
One of the following settings is set at the multi-function input terminals: <ul style="list-style-type: none"> External Search Command 1 and External Search Command 2 (61 vs. 62) Fast-Stop N.O. and Fast-Stop N.C. (15 vs. 17) 		
LED Operator Display		Error Name
oPE05	oPE05	Run Command/Frequency Reference Source Selection Error
Cause		Possible Solutions
Frequency reference is assigned to an option unit (b1-01 = 2 or 3) that is not connected to the drive.		Reconnect the option unit to the drive.
The Run command is assigned to serial communication (b1-02 = 2) but no communication option is connected to the drive.		
LED Operator Display		Error Name
oPE10	oPE10	V/f Data Setting Error
Cause		Possible Solutions
—		Correct the settings for E1-04, -06, -07 and -09.
LED Operator Display		Error Name
oPE11	oPE11	Carrier Frequency Setting Error
Cause		Possible Solutions
The following simultaneous contradictory settings: C6-05 is greater than 6 and C6-04 is greater than C6-03 (carrier frequency lower limit is greater than the upper limit). If C6-05 is less than or equal to 6, the drive operates at C6-03. Upper and lower limits between C6-02 and C6-05 contradict each other.		Correct the parameter settings.

6.7 Diagnosing and Resetting Faults

When a fault occurs and the drive stops, follow the instructions below to remove whatever conditions triggered the fault, then restart the drive.

◆ Fault Occurs Simultaneously with Power Loss

WARNING! *Electrical Shock Hazard. Ensure there are no short circuits between the main circuit terminals (R/L1, S/L2, and T/L3) or between the ground and main circuit terminals before restarting the drive. Failure to comply may result in serious injury or death and will cause damage to equipment.*

1. Turn on the drive input power.
2. Remove the cause of the fault and reset.











Note: To find out what faults were triggered, check U2-02 (Fault History).

Note: When the fault continues to be displayed after cycling power, remove the cause of the fault and reset.


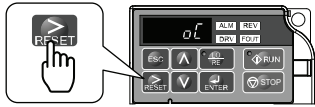
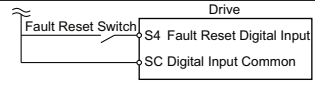
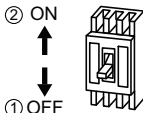
◆ If the Drive Still has Power After a Fault Occurs

1. Look at the LED operator for information on the fault that occurred.
2. Refer to [Fault Displays, Causes and Possible Solutions on page 129](#)
3. Reset the fault. Refer to [Fault Reset Methods on page 139](#).

◆ Viewing Fault History Data After Fault

Step	Display/Result
1. Turn on the drive input power. The first screen displays.	
2. Press  until the monitor screen is displayed.	
3. Press  to display the parameter setting screen.	
4. Press  and  until U2-02 (Fault History) is displayed.	
5. Press  to view previous fault (here, oC).	



◆ Fault Reset Methods

After the Fault Occurs	Procedure	
Fix the cause of the fault, restart the drive, and reset the fault	Press  on the digital operator.	
Resetting via Fault Reset Digital Input S4	Close then open the fault signal digital input via terminal S4. S4 is set fault reset as default (H1-04 = 12)	
If the above methods do not reset the fault, turn off the drive main power supply. Reapply power after LED operator display is out.		

6.8 Troubleshooting without Fault Display



This section describes troubleshooting problems that do not trip an alarm or fault.




◆ Cannot Change Parameter Settings

Cause	Possible Solutions
The drive is running the motor (i.e., the Run command is present).	<ul style="list-style-type: none"> Stop the drive and switch over to the Programming Mode. Most parameters cannot be edited during run.
The Access Level is set to restrict access to parameter settings.	<ul style="list-style-type: none"> Set the Access Level to allow parameters to be edited (A1-01 = 2).
The operator is not in the Parameter Setup Mode (the LED screen will display “PAR”).	<ul style="list-style-type: none"> See what mode the LED parameter is current set for. Parameters cannot be edited when in the Setup Mode (“STUP”). Switch modes so that “PAR” appears on the screen.
The wrong password was entered.	<ul style="list-style-type: none"> If the password entered to A1-04 does not match the password saved to A1-05, then drive settings cannot be changed. Reset the password. If you cannot remember the password: <ul style="list-style-type: none"> Display parameter A1-04. Press the  button while pressing  at the same time. Parameter A1-05 will appear. Set a new password to parameter A1-05.
Undervoltage was detected.	<ul style="list-style-type: none"> Check the drive input power voltage by looking at the DC bus voltage (U1-07). Check all main circuit wiring.

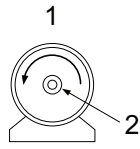
◆ Motor Does Not Rotate Properly after Pressing RUN Button or after Entering External Run Command

■ Motor Does Not Rotate

Cause	Possible Solutions
The drive is not in the Drive Mode.	<ul style="list-style-type: none"> Check if the DRV light on the LED operator is lit. Enter the Drive Mode to begin operating the motor. <i>Refer to The Drive and Programming Modes on page 59.</i>
The  button was pushed.	<p>Stop the drive and check if the correct frequency reference source is selected. If the operator keypad shall be the source, the LO/RE button LED must be on, if the source is REMOTE, it must be off.</p> <p>Take the following step to solve the problem:</p> <ul style="list-style-type: none"> Push the  button.
A Fast-Stop was executed and has not yet been reset.	Reset the Fast-Stop command.
Settings are incorrect for the source that provides the run command.	<p>Check parameter b1-02 (Run Command Selection). Set b1-02 so that it corresponds with the correct run command source.</p> <p>0: LED operator 1: Control circuit terminal (default setting) 2: MEMOBUS/Modbus communications</p>
There is faulty wiring in the control circuit terminals.	<ul style="list-style-type: none"> Check the wiring for the control terminal. Correct wiring mistakes. Check the input terminal status monitor (U1-10).
The drive has been set to accept the frequency reference from the incorrect source.	<p>Check parameter b1-01 (Frequency Reference Selection 1). Set b1-01 to the correct source of the frequency reference.</p> <p>0: LED operator 1: Control circuit terminal (default setting) 2: MEMOBUS/Modbus communications 3: Potentiometer (option)</p>
The terminal set to accept the main speed reference is set to the incorrect voltage and/or current.	Check DIP switch S1. Next assign the correct input level to terminal A1 (H3-01). <i>Refer to DIP Switch S1 Analog Input Signal Selection on page 48.</i>
Selection for the sink/source mode is incorrect.	Check DIP switch S3. <i>Refer to Sinking/Sourcing Mode Switch on page 46.</i>
Frequency reference is too low.	<ul style="list-style-type: none"> Check the frequency reference monitor (U1-01). Increase the frequency by changing the maximum output frequency (E1-09).
Multi-function analog input is set up to accept gain for the frequency reference, but no voltage (current) has been provided.	<ul style="list-style-type: none"> Check the multi-function analog input settings. Check if H3-02 has been set to the proper values. Check if the analog input value has been set properly.

Cause	Possible Solutions
The  button was pressed when the drive was started from a REMOTE source.	<ul style="list-style-type: none"> When the  button is pressed, the drive will decelerate to stop. Switch off the run command and then re-enter a run command. The  button is disabled when o2-02 is set to 0.
Motor is not producing enough torque.	<ul style="list-style-type: none"> Ensure the selected V/f pattern corresponds with the characteristics of the motor being used. Increase both the minimum and mid output frequency voltages (E1-08, E1-10). <p>Increase the frequency reference so that it is higher than the minimum frequency reference (E1-09).</p> <p>Increase the torque compensation gain (C4-01).</p>
The drive is set for both 2-Wire and 3-Wire sequence at the same time.	<ul style="list-style-type: none"> The drive is set for a 3-Wire sequence when one of parameters H1-03 through H1-05 is set to 0. If the drive is supposed to be set up for a 2-Wire sequence, then ensure parameters H1-03 through H1-05 are not set to 0. If the drive is supposed to be set up for a 3-Wire sequence, then H1-□□ must be set to 0.

■ Motor Rotates in the Opposite Direction from the Run Command

Cause	Possible Solutions
Phase wiring between the drive and motor is incorrect.	<ul style="list-style-type: none"> Check the motor wiring. Switch two motor cables (U, V, and W) to reverse motor direction. Connect drive output terminals U/T1, V/T2 and W/T3 in the right order to the corresponding motor terminals U, V, and W. Change the setting of parameter b1-14.
The forward direction for the motor is setup incorrectly.	<p>Typically, forward is designated as being counterclockwise when looking from the motor shaft (refer to the figure below).</p> <div style="text-align: center;">  </div> <p>1. Forward Rotating Motor (looking down the motor shaft) 2. Motor Shaft</p>

Note: Check the motor specifications for the forward and reverse directions. The motor specifications will vary depending on the manufacturer of the motor.

■ Motor Rotates in One Direction Only

Cause	Possible Solutions
The drive prohibits reverse rotation.	<ul style="list-style-type: none"> Check parameter b1-04. Set the drive to allow the motor to rotate in reverse (b1-04 = “0”).
A Reverse run signal has not been entered, although 3-Wire sequence is selected.	<ul style="list-style-type: none"> Make sure that one of the input terminals S3 to S5 used for the 3-Wire sequence has been set for reverse.

■ Motor is Too Hot

Cause	Possible Solutions
The load is too heavy.	<p>If the load is too heavy for the motor, the motor will overheat as it exceeds its rated torque value for an extended period of time. Keep in mind that the motor also has a short-term overload rating in addition to the possible solutions provided below:</p> <ul style="list-style-type: none"> Reduce the load. Increase the acceleration and deceleration times. Check the values set for the motor protection (L1-01, L1-02) as well as the motor rated current (E2-01). Increase motor capacity.
The air around the motor is too hot.	<ul style="list-style-type: none"> Check the ambient temperature. Cool the area until it is within the specified temperature range.
Insufficient voltage insulation between motor phases.	<p>When the motor is connected to terminals U/T1, V/T2, and W/T3, voltage surges occur between the motor coils and drive switching. Normally, surges can reach up to three times the drive input power supply voltage (600 V for 200 V class, and 1200 V for 400 V class).</p> <ul style="list-style-type: none"> Use a motor with voltage tolerance higher than the max voltage surge. Use a motor designed to work specifically with a drive when using a 400 V class unit. Install an AC reactor on the output side of the drive.
The motor fan has stopped or is clogged.	Check the motor fan.

6.8 Troubleshooting without Fault Display

■ Motor Stalls During Acceleration or With Large Loads

Cause	Possible Solutions
Load is too heavy.	Take the following steps to resolve the problem: <ul style="list-style-type: none"> • Reduce the load. • Increase the acceleration time. • Increase motor capacity. • Although the drive has a Stall Prevention function and a Torque Compensation Limit function, accelerating too quickly or trying to drive an excessively large load can exceed the capabilities of the motor.

■ Motor Will Not Accelerate or the Acceleration Time is Too Long

Cause	Possible Solutions
Frequency reference is too low.	<ul style="list-style-type: none"> • Check the maximum output frequency (E1-04). • Increase E1-04 if it is set too low. Check U1-01 for proper frequency reference. Check if a frequency reference signal switch has been set to one of the multi-function input terminals. Check for low gain level set to terminal A1 (H3-03).
Load is too heavy.	<ul style="list-style-type: none"> • Reduce the load so that the output current remains within the motor-rated current. • In extruder and mixer applications, the load will sometimes increase as the temperature drops. Check if the mechanical brake is fully releasing as it should.
Acceleration time has been set too long.	Check if the acceleration time parameters have been set too long (C1-01, -03).
Motor characteristics and drive parameter settings are incompatible with one another in V/f Control.	<ul style="list-style-type: none"> • Set the correct V/f pattern so that it matches the characteristics of the motor being used. • Check the motor data and adjust V/f pattern settings.
Incorrect frequency reference setting.	<ul style="list-style-type: none"> • Check the multi-function analog input settings. • Ensure the analog input value is set to the right value (U1-13).
The Stall Prevention level during acceleration and deceleration set too low.	<ul style="list-style-type: none"> • Check the Stall Prevention level during acceleration (L3-02). • If L3-02 is set too low, acceleration will take a fair amount of time. • Increase L3-02.
The Stall Prevention level during run has been set too low.	<ul style="list-style-type: none"> • Check the Stall Prevention level during run (L3-06). • If L3-06 is set too low, speed will drop as the drive outputs torque. • Increase the setting value.

■ Drive Frequency Reference Differs from the Controller Frequency Reference Command

Cause	Possible Solutions
The analog input frequency gain and bias are set to incorrect values.	<ul style="list-style-type: none"> • Check the frequency reference terminal input gain level assigned to terminal A1 (parameter H3-03).

■ Poor Speed Control Accuracy

Cause	Possible Solutions
Slip compensation function disabled or set up incorrectly.	<ul style="list-style-type: none"> • Adjust the slip compensation gain (C3-01).

■ Deceleration Takes Longer Than Expected when Using a Braking Resistor

Cause	Possible Solutions
L3-04 is set incorrectly.	<ul style="list-style-type: none"> • Check the Stall Prevention Level during deceleration (L3-04). • If a braking resistor option has been installed, disable Stall Prevention during deceleration (L3-04 = "0").
The deceleration time is set too long.	Set deceleration to more appropriate time (C1-02 and C1-04).
Insufficient motor torque.	<ul style="list-style-type: none"> • Assuming parameter settings are normal and that no overvoltage occurs when there is insufficient torque, it is likely that the demand on the motor has exceeded the motor capacity. • Use a larger motor.
Load exceeded the internal torque limit determined by the drive rated current.	Switch to a larger capacity drive.

■ Motor Hunting Occurs When Operating With a Light Load

Cause	Possible Solutions
Carrier frequency is too high.	Lower the carrier frequency setting C6-02.
Large V/f setting value at low speeds triggers overexcitation.	<ul style="list-style-type: none"> • Use parameters E1-04 through E1-10 to set the V/f pattern in relation to the load characteristics.
The maximum output frequency and the base frequency reference are not set properly in relationship to each other.	Set the proper values for the maximum output frequency and base frequency (E1-04, E1-06).

Cause	Possible Solutions
Hunting Prevention is set up incorrectly.	Adjust the hunting prevention gain (n1-02).

■ Noise From Drive or Output Lines When the Drive is Powered On

Cause	Possible Solutions
Relay switching in the drive generates excessive noise.	<ul style="list-style-type: none"> Lower the carrier frequency (C6-02). Install a noise filter on the input side of drive input power. Install a noise filter on the output side of the drive. Place the wiring inside a metal conduit to shield it from switching noise. Ground the drive and motor properly. Separate the main circuit wiring and the control lines.

■ Ground Fault Circuit Interrupter (GFCI) Trips During Run

Cause	Possible Solutions
Excessive leakage current trips MCCB.	<ul style="list-style-type: none"> Increase the GFCI sensitivity or use GFCI with a higher threshold. Lower the carrier frequency (C6-02). Reduce the length of the cable used between the drive and the motor. Install a noise filter or reactor on the output side of the drive.

■ Connected Machinery Vibrates When Motor Rotates

Excessive Motor Oscillation and Erratic Rotation

Cause	Possible Solutions
Poor balance between motor phases.	Check drive input power voltage to ensure that it provides stable power.

Unexpected Noise from Connected Machinery

Cause	Possible Solutions
The carrier frequency is at the resonant frequency of the connected machinery.	Adjust the carrier frequency using parameters C6-02 through C6-05.
The drive output frequency is the same as the resonant frequency of the connected machinery.	<ul style="list-style-type: none"> Adjust the parameters used for the Jump Frequency function (d3-01 through d3-04) to skip the problem-causing bandwidth. Place the motor on a rubber pad to reduce vibration.

Note: The drive may have trouble assessing the status of the load due to white noise generated when using Swing PWM (C6-02 = 7).

■ Oscillation or Hunting

Cause	Possible Solutions
Insufficient tuning.	Adjust Hunting prevention Gain Setting (n1-02).
The frequency reference is assigned to an external source and the signal is noisy.	<ul style="list-style-type: none"> Ensure that noise is not affecting the signal lines. Separate main circuit wiring and control circuit wiring. Use twisted-pair cables or shielded wiring for the control circuit. Increase the analog input time filter constant (H3-13).
The cable between the drive and motor is too long.	<ul style="list-style-type: none"> Reduce the length of the cable.

■ Motor Rotates After the Drive Output is Shut Off

Cause	Possible Solutions
Low DC Injection Braking and the drive cannot decelerate properly.	<ul style="list-style-type: none"> Adjust the DC Injection braking settings. Increase the value of b2-02 (DC Injection Braking Current). Increase the b2-04 (DC Injection Braking Time at Stop).

■ Torque or Speed Loss Occurs When Starting into a Rotating Load

Cause	Possible Solutions
The load is already rotating when the drive is trying to start it.	<ul style="list-style-type: none"> Stop the motor using DC Injection braking. Restart the motor. Increase the value of b2-03 (DC Injection Braking Time at start). Set a multi-function input terminal for external Speed Search command (H1-□□="61" or "62" during restart).

■ Output Frequency is not as High as Frequency Reference

Cause	Possible Solutions
Frequency reference is set within the range of the Jump Frequency.	<ul style="list-style-type: none"> Adjust the parameters used for the Jump Frequency function (d3-01, d3-02). Enabling the Jump Frequency prevents the drive from outputting the frequencies specified in the Jump Frequency range.
Upper limit for the frequency reference has been exceeded.	<ul style="list-style-type: none"> Set the maximum output frequency and the upper limit for the frequency reference to more appropriate values (E1-04, d2-01). The following calculation yields the upper value for the output frequency = $E1-04 \times d2-01 / 100$

6.8 Troubleshooting without Fault Display

Cause	Possible Solutions
Large load triggered Stall Prevention function during acceleration.	<ul style="list-style-type: none"> Reduce the load. Adjust the Stall Prevention level during acceleration (L3-02).

■ Buzzing Sound from Motor at 2 kHz

Cause	Possible Solutions
Exceeded 110% of the rated output current of the drive while operating at low speeds.	<ul style="list-style-type: none"> If the output current rises too high at low speeds, the carrier frequency automatically reduces and causes a whining or buzzing sound. If the sound is coming from the motor, disable carrier frequency derating (L8-38 = "0"). Disabling the automatic carrier frequency derating increases the chances of an overload fault (oL2). Switch to a larger capacity motor if oL2 faults occur too frequently.

■ Motor Does Not Operate When the RUN Button on the Digital Operator is Pressed

Cause	Possible Solutions
The LOCAL/REMOTE mode is not selected properly.	Press the LOCAL/REMOTE button to switch. The LO/RE LED should be on for LOCAL mode.
The drive is not in drive mode.	A run command will not be issued. Exit to the drive mode and cycle the run command.
The frequency reference is too low.	<ul style="list-style-type: none"> If the frequency reference is set below the frequency set in E1-09 (Minimum Output Frequency), the drive will not operate. Raise the frequency reference to at least the minimum output frequency.

■ Motor Does Not Operate When an External Run Command is Input

Cause	Possible Solutions
The LOCAL/REMOTE mode is not selected properly.	Press the LOCAL/REMOTE button to switch. The LO/RE LED should be off for REMOTE mode.
The drive is not in Drive Mode.	A run command will not be issued. Exit to the Drive mode and cycle the run command.
The frequency reference is too low.	<ul style="list-style-type: none"> If the frequency reference is set below the frequency set in E1-09 (Minimum Output Frequency), the drive will not operate. Raise the frequency reference to at least the minimum output frequency.

■ Motor Stops During Acceleration or When a Load is Connected

Cause	Possible Solution
<ul style="list-style-type: none"> The load is too heavy. The limit of motor response may be reached during rapid acceleration. This may be a result of improper stall prevention or automatic torque boost function adjustment. 	Increase the acceleration time (C1-01) or reduce the motor load. Also, consider increasing the motor size and/or drive size.

■ Motor Rotates in One Direction Only

Cause	Possible Solution
"Reverse run prohibited" is selected. If b1-04 (Reverse Prohibit Operation) is set to 1 (reverse run prohibited), the drive will not accept a reverse run command.	Set b1-04 = "0" to allow reverse run operation.

■ Peripheral Devices Affected by Drive Operation

Cause	Possible Solutions
Radio frequency interference may be generated by drive output PWM waveform.	<ul style="list-style-type: none"> Change the Carrier Frequency Selection (C6-02) to lower the carrier frequency. This will help to reduce the amount of transistor switching noise. Install an Input Noise Filter at the input power terminals. Install an Output Noise Filter at the motor terminals. Use conduit. Metal can shield electrical noise. Ground the drive and motor. Separate main circuit wiring from control wiring.

■ Ground Fault Interrupter Activates When Drive is Running

Cause	Possible Solutions
The output of the drive is a series of high frequency pulses (PWM), so there is a certain amount of leakage current. This may cause the ground fault interrupter to operate and cut off the drive input power.	<ul style="list-style-type: none"> Change to a ground fault interrupter with a higher leakage current detection level (such as, a sensitivity current of 200 mA or greater per Unit, with an operating time of 0.1 s or more), or one that incorporates high-frequency corrective actions. Change the Carrier Frequency Selection (C6-02) to lower the carrier frequency. <p>Note: Leakage current increases in proportion to cable length.</p>