

## 1333D TROUBLESHOOTING GUIDE

### Preventive Maintenance and Troubleshooting Common Drive Problems

#### Preventive Maintenance

The Bulletin 1333 is convection cooled by air flowing through the heat sink slots. The slots must never be allowed to become obstructed with dirt or foreign matter. Periodically check and clean the heat sink slots.

#### Problems with Your Drive? Check the Following First

The following descriptions indicate the operation of protective circuitry in the Series D Bulletin 1333. What is thought to be a drive operational problem, may in reality be normal protection circuit operation.

#### Precheck Procedures

##### Acceleration Stall Protection -- No Fault is Displayed

###### The Reason

During motor acceleration, if current exceeds 140% of rated Drive current or 125% of Parameter 7, the overcurrent stall protection circuit operates. In order to guard against currents in excess of these values and prevent an overcurrent trip, this circuit temporarily stops drive acceleration. When load current is again below these values, the circuit lets the drive continue to accelerate to set frequency.

###### Precheck Procedure

If the application does not require this function it can be deactivated by setting Parameter 17 to 0.

##### Deceleration Stall Protection -- No Fault is Displayed

###### The Reason

During motor deceleration, if current exceeds 140% of rated Drive current or 125% of Parameter 7, the overcurrent stall protection circuit operates. In order to guard against currents in excess of these values and prevent an overcurrent trip, this circuit temporarily stops drive deceleration. When load current is again below these values, the circuit lets the drive continue to decelerate to set frequency.

###### Precheck Procedure

Both Parameters 18 and 46 will protect the drive from nuisance trips during motor deceleration. If the application does not require this function it can be deactivated by setting Parameters 18 and/or 46 to 0.

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## Over Current Protection -- OC is Displayed

### The Reason

If overcurrent exceeds 200% of rated Drive current or if a ground fault occurs at the drive output leads, this protective circuit will shut off the drive transistors.

### Precheck Procedure

1. Load inertia is excessively large and programmed acceleration time is extremely short. Setting Parameter 17 to 1 or increasing the value of Parameter 1 will guard against OC nuisance trips.
2. The motor experienced an excessive overload condition. If the drive tripped on acceleration, setting Parameter 7 to a higher current limit setting may avoid OC nuisance trips. If the drive trips only on deceleration, enabling Parameter 46 may avoid OC nuisance trips on deceleration.
3. A short circuit exists in the drive output leads or in the motor windings.
4. A ground fault exists in the drive output leads or in the motor windings.
5. A device in the Drive output inverter section has shorted.

## Over Load Protection -- OL is Displayed

### The Reason

If Parameter 6 is set to 0 and current exceeds 140% of rated Drive current for 60 seconds, this protective circuit will shut off the drive transistors.

If Parameter 6 is set to a value other than 0 and current exceeds 125% of Parameter 7 for 60 seconds, this protective circuit will shut off the drive transistors.

### Precheck Procedure

1. The starting load is above 140%. The Drive is attempting to start the load, but Parameter 17 is preventing it. Disable Parameter 17.
2. The running load has been above 140% for one minute. The Drive may be in accel frequency hold if below the current limit set by Parameter 7, or in accel frequency hold if at the current limit set by Parameter 7. Check Parameters 17 and 6. If neither accel frequency hold nor overload protection is selected, the Drive has been between 140% and 180% of rated current for one minute, tripped out, and is functioning normally.
3. The running load has been above 125% of Parameter 7 for 60 seconds causing the motor to overheat and the drive to trip. Check Parameters 17 and 7, then check to see if Parameter 6 is set to a value other than 0.

## Over Voltage Protection -- OU Displayed

### The Reason

When DC bus voltage rises above a preset level due to high incoming line voltage or excessive regenerative energy, this protective circuit stops transistor operation and annunciates the condition as shown.

### Precheck Procedure

1. Check and correct the incoming line voltage.
2. An extremely short deceleration time is the primary cause of excessive regenerative line energy. Setting Parameter 18 to 1 or increasing Parameter 2 will guard against OU nuisance trips. It may also be necessary to add the Heavy Duty Dynamic Braking option.

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## Low Voltage Protection -- LU is Displayed

### The Reason

When incoming line voltage falls below 90% for 15 ms, this protective circuit stops transistor operation to guard against incorrect drive operation.

### Precheck Procedure

If the momentary power failure is less than 15 ms, operation is not interrupted. If more than 15 ms, the drive will trip and line voltage must be restored by cycling power. If automatic restart of the drive is required, set Parameter 48 to 1 or 2.

## Over Temperature Protection -- OH is Displayed

### The Reason

When heat sink temperature rises above + 50°C, this protective circuit stops transistor operation and annunciates the condition as shown.

### Precheck Procedure

Check the drive ambient temperature. For 7 1/2-20 HP (5.5-15 kW) units, check the cooling fan.

## Auxiliary Interlock Trip -- AU is Displayed

### The Reason

It is possible that the drive was stopped by an external interlock. External interlocks (a thermal overload relay or an external sequence circuit for example), are connected to terminals 16 and 17 at the Control and Signal Wiring Terminal Block.

### Precheck Procedure

Refer to 1333D Connection Guide for an explanation of external interlocks.

## Operating Error -- OP is Displayed

### The Reason

The drive must always receive a valid stop command before it can run. This fault will be displayed and the drive will not start if:

1. The local stop pushbutton is pressed to stop the drive and Parameter 8 is set to 1 or 3.
2. A remote stop signal is sent and Parameter 8 is set to 2.
3. Parameter 8 is set to 1 or 3 and an external stop signal is not present when power is applied to the drive.

### Precheck Procedure

1. Send an external stop signal to clear the fault, then try again.
2. Press the local stop pushbutton to clear the fault, then try again.
3. Ensure that an external stop signal is present before reapplying power to the drive, then try again.

## Operating Error -- CPU is Displayed

### The Reason

A CPU is an internal software communications error. A CPU error will not be stored in the drive fault buffers.

### Precheck Procedure

Clear the fault by removing then reapplying power to the drive.

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## Troubleshooting Common Drive Problems

**Eight** common problems that may be experienced when operating the Series D Bulletin 1333 and their solutions are listed in the remaining pages of this section.

- 1. The motor will not run.**
- 2. The motor will not run continuously.**
- 3. The motor generates an excessive amount of heat**
- 4. The drive will not reverse in local control.**
- 5. The drive will not ramp-to-stop.**
- 6. The drive will not accelerate to maximum speed.**
- 7. The drive will not decelerate to minimum speed.**
- 8. An input line fuse has blown.**

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***ATTENTION:***

Power must be applied to the drive with the cover removed to perform certain troubleshooting checks. Voltages on many components are at incoming line potential or bus voltage. To avoid electric shock or damage to equipment, do not touch any drive components with power applied.

***ATTENTION:***

Become familiar with the equipment and read through the wiring, speed selection and adjustment sections before attempting to perform the startup procedures. Adjustments may be required to meet specific load characteristics or operator preference.

Exercise extreme care when performing any task on the drive. Failure to do so may result in electric shock or equipment damage.

A DC bus neon light at the top of the 1333 has been provided to provide visual indication that bus voltage is present. Bus voltage may be verified by using a voltmeter and measuring the voltage between +BUS and -BUS on the Power Terminal Block. Do not attempt to service the drive until 2 minutes after the neon light has extinguished and bus voltage has discharged to zero volts.

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## 1. The motor will not run -- AU is displayed.

Are Terms 16 and 17 at the Control and Signal Wiring Terminal Block jumpered? Is an auxiliary interlock installed between Terms 16 and 17?

**No**

Remove the cause of the interlock fault or jumper terminals 16 and 17 if an auxiliary interlock is not required.

**Yes**

Contact your nearest A-B representative for application assistance

## 1. The motor will not run -- OH is displayed.

Is ambient temperature above the rated limit of 50°C? Are the cooling fins clogged or is the heat sink dirty? For 7 1/2-20 HP (5.5-15 kW) units, is the cooling fan rotating?

**No**

Lower the ambient temperature, clean the heat sink, or replace the cooling fan

**Yes**

Contact your nearest A-B representative for application assistance

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## 1. The motor will not run -- No fault is displayed.

Is rated input voltage present at terminals R/L1, S/L2, and T/L3	<b>No</b>	Check input side for circuit breaker trip, contactor coil malfunction, blown fuse, etc.
<b>Yes</b>		
Is the decimal point in the mode display lit?	<b>No</b>	The drive is in the programming mode. Give the drive a valid stop command and press the lock switch. The decimal point in the mode display will light and the local or remote control source currently controlling the drive will be displayed.
<b>Yes</b>		
Is Parameter 8 set correctly?	<b>No</b>	Parameter 8 settings.  0 = Local start/stop control without maintained external stop. 1 = Remote 2-wire start/stop control at the Control and Signal Wiring Terminal Block. 2 = Local start/stop control with maintained external stop. 3 = Remote 3-wire start/stop control at the Control and Signal Wiring Terminal Block.
<b>Yes</b>		
Is parameter set correctly?	<b>No</b>	Parameter 9 settings  0 = Local speed control. 1,2 or 3 = Remote speed control only at the Control and Signal Wiring Terminal Block -- Terms 1, 2 and 3. 1 = External speed pot or 0-5V DC. 2 = External speed pot or 0-10V DC 3 = External speed pot or 4-20 mA
<b>Yes</b>		
Are Parameters 6 and 7 set correctly?	<b>No</b>	If Parameter 6 is set to a value other than 0, Parameter 7 is active. Parameter 7 must then be set to the motors nameplate current rating.
<b>Yes</b>		
Are the motor leads securely connected to drive output terminals U/T1, V/T2 and W/T3?	<b>No</b>	Verify and change connections if necessary.
<b>Yes</b>		
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## 1. The motor will not run -- OP is displayed.

Is Parameter 8 Local/Remote Control set to 1 (external control)?

**Yes**

The drive is set for 2-wire external control. Check for correct wiring at the Control and Signal Wiring Terminal Block. Reset the drive with an external stop command.

**No**

Is Parameter 8 Local/Remote Control set to 2 (local control )?

**Yes**

An external maintained stop signal must first be present to start the drive. Check for correct wiring at the Control and Signal Wiring Terminal Block Reset the drive by pressing the local stop button.

**No**

Is Parameter 8 Local/Remote Control set to 3 (external control)?

**Yes**

The drive is set for 3-wire external control. Check for correct wiring at the Control and Signal Wiring Terminal Block. Reset the drive with an external stop command.

## 2. The motor will not run continuously-- LU is displayed.

Has incoming line voltage dropped below 90% of rated voltage?

**Yes**

Monitor the incoming line voltage and correct the condition.

**No**

Contact your nearest A-B representative for application assistance.

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## 2. The motor will not run continuously -- OC is displayed.

Does a short circuit exist in the output leads or motor windings?

**Yes**

Remove the cause of the short circuit.

**No**

Does a ground fault exist between the drive output leads and the motor or in the motor windings?

**Yes**

Remove the cause of the ground fault

**No**

Does the drive trip when the speed reference is below 5.0 Hz?

**Yes**

Is the application a fan or pump system?

**No**

**Yes**

**No**

Reduce the boost setting in Parameter 5	Change the V/Hz ramp to variable by setting Parameter 4 to 1, then reduce the boost level setting in Parameter 5 if required.
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Is the acceleration time too short? Is Parameter 17, Accel Frequency Hold off?

**Yes**

Increase the value of Accel Time 1 Parameter 1 or set Parameter 17 Accel Frequency Hold on.

**No**

Is the load within the rated current of the drive ?

**No**

Program Parameter 46 Current Limit to eliminate nuisance tripping, lighten the load, or resize the drive and motor to meet your application.

**Yes**

Is OC displayed even if the drive output leads are disconnected?

**No**

Verify motor operation by line operating the motor or repeating the above. Is the motor now operating correctly?

**Yes**

**Yes**

**No**

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## 2. The motor will not run continuously -- OL is displayed.

Is the load current equal to the motor nameplate rating? Is the load current within the rated current of the drive?

**No**

An OL trip occurs when the load current is greater than 140% for one minute. Lighten the load or resize the drive and motor to meet your application

**Yes**

Is Parameter 6 set to 1, 2 or 3?

**No**

When set to 1, 2 or 3, the thermal overload function is enabled. Check for the correct setting.

**Yes**

Is Parameter 7 set to the rated motor nameplate value?

**Yes**

An OL trip occurs when the load current is greater than 125% of the overload current value set in Parameter 7 for one minute. Lighten the load or resize the drive and motor to meet your application.

**No**

Set Parameter 7 to the rated motor nameplate value.

## 2. The motor will not run continuously-- OU is displayed.

Is the incoming AC power line high?

**Yes**

Monitor and correct the AC line.

**No**

Is the deceleration time too short? Is Parameter 18, the Decel Frequency Hold off?

**Yes**

Increase the value of Decel Time 1 Parameter 2, or set Parameter 18 Decel Frequency Hold on

**No**

Is an overhauling load present--Does the load increase the motor speed beyond the drive set speed?

**Yes**

Increase the value of Parameter 14 DC Hold Volts. Install the Heavy Duty Dynamic Brake Option. Does the problem still exist?

**No**

**Yes**

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## 3. The motor generates an excessive amount of heat--No fault is displayed.

Is full load demanded continuously at low frequency?

Yes

An OL trip occurs when the load current is greater than 140% for one minute. Lighten the load or resize the drive and motor to meet your application.

No

Is the motor operating above the full load current?

Yes

The load is beyond the motor capacity. Check the mechanical installation. If the motor and drive are undersized, resize them for your application.

No

Check the motor and wiring connections for an open phase condition.

## 4. The drive will not reverse in local control--No fault is displayed.

Has the drive been programmed to lock out reverse operation (Parameter 10 set 1)?

No

Set Parameter 10 to 0.

Yes

Contact your nearest A-B representative for application assistance.

## 5. The drive will not ramp-to-stop -- No fault is displayed.

Is Parameter 11 Stop Select set to ramp-to-stop?

No

Set Parameter 11 to 0

Yes

Does Parameter 59 show an OU fault stored?

Yes

The drive is tripping on over voltage during decel. Refer to page 2 (OU).

No

Is the DC Hold Frequency set to high -- Is parameter 12 set to 00.50 Hz?

No

Set Parameter 12 to 00.50 Hz

Yes

Is Parameter 18 Decel Frequency Hold on-- Does the motor have an overhauling load?

Yes

If Parameter 18 Decel Frequency Hold is set to 1 (ON), an overhauling load may cause the decel ramp to hold at one frequency for an extended period. This may cause ramp-to-stop commands to appear to be non-functional.

No

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## 6. The drive will not accelerate to maximum speed -- No fault is displayed.

The maximum allowable drive output frequency will be determined by the lowest programmed value of any of the following parameters:

- Parameter 3 Frequency Range
- Parameter 15 Maximum Frequency
- Parameter 51 Upper Frequency Clamp
- Parameter 53 Bias Frequency--If Parameter 53 is Higher Than Parameter 54
- Parameter 54 Gain Frequency--If Parameter 54 is Higher Than Parameter 53

Is Parameters 3 Frequency Range and/or 15 Maximum Frequency set high enough to allow the drive to accelerate to maximum speed?

**No**

Reset Parameters 3 and/or 15.

**Yes**

Is Parameter 51 Upper Frequency Clamp set to a value lower than the required maximum frequency?

**No**

Reset Parameter 51 to maximum frequency.

**Yes**

Is this an inverse speed follower application?

**Yes**

To program the drive for an inverse speed follower application, set Parameter 53 to the maximum frequency required and Parameter 54 to the minimum frequency required.

**Yes**

Is Parameter 53 Bias Frequency set to a higher value than Parameter 54 Gain Frequency (standard setting for inverse speed follower applications)?

**Yes**

If an inverse speed follower is required, reprogram Parameter 53 to maximum frequency. If an inverse follower is not required, reprogram Parameters 53 and 54 as required.

**No**

Is Parameter 53 Bias Frequency set to a lower value than the required maximum frequency?

**Yes**

Reset Parameter 53 to maximum Frequency.

**No**

Are Parameters 42-45 programmed to exclude maximum frequency?

**Yes**

Reprogram Parameters 42, 43 and/or 44 to a value below the maximum frequency. Reprogram Parameter 45 to a bandwidth that will not include the maximum frequency value.

**No**

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## 7. The drive will not decelerate to minimum speed--No fault is displayed.

The priority used by the 1333 to limit minimum output frequency is:

1. For local speed control, use Parameter 50.
2. If an external potentiometer, 0-5V DC, 0-10V DC or 4-20mA signal is to control drive speed, use the higher of the values set by Parameters 15 and 51.

Is Parameter 50 Lower Frequency Clamp set to a value higher than the required minimum frequency?

**Yes**

Is zero output speed required at a zero external input signal?

**No**

Are Parameters 42-44 Skip Frequencies 1, 2 and 3 and/or Parameter 45 programmed to exclude minimum frequency?

**No**

Contact your nearest A-B representative for application assistance.

## 8. An input line fuse has blown--No fault is displayed.

Are the drive input fuses sized according with the values given in 1333D Connection Guide ?

**Yes**

Are the drive input and output terminals wired as shown in 1333D Connection Guide ?

**Yes**

Reset Parameter 50 to minimum frequency.

**No**

To program the drive for a directly proportional input signal, set Parameter 53 to the minimum frequency required and Parameter 54 to the maximum frequency required.

**Yes**

Reprogram Parameters 42, 43 and/or 44 to a value above minimum frequency. Reprogram Parameter 45 to a bandwidth that will not include the minimum frequency.

**Yes**

Replace with the correct fuses.

**No**

Wire as shown. Do the input fuses still blow?

**No**

**Yes**

Contact your nearest A-B representative for application assistance.