

Please click on drive family of interest



**Commander SK**

**Fault Code  
Diagnostics**



**Commander SE**



**Unidrive SP, GP20, Affinity, and Unidrive Classic**



**Quantum III/ Mentor II**



**Focus 1 & Focus 3**



Troubleshooting Guide #	Rev	Drive Family	Description	
<a href="#">CTTG 126</a>	1.0	Commander SE	HF Fault Trip Codes	
<a href="#">CTTG 127</a>	1.1	Unidrive SP	Unidrive SP & EZmotion	
<a href="#">CTTG 128</a>	1.0	Unidrive Classic	Unidrive UD7x Trip Codes	
<a href="#">CTTG 129</a>	1.0	Unidrive SP	Unidrive SP & EZ Motion SLX.HF	
<a href="#">CTTG 130</a>	1.0	Mentor II/Quantum III	Membrane Keypad Connections	
<a href="#">CTTG 131</a>	1.0	Unidrive Classic	Oh2 Trips	
<a href="#">CTTG 132</a>	1.0	Unidrive SP	O.ht2 Trips	
<a href="#">CTTG 133</a>	1.0	Unidrive Classic Size 5	Ot HSn Faults	
<a href="#">CTTG 134</a>	1.0	Mentor II/Quantum III	Determining a Faulty Field Bridge Rectifier	
<a href="#">CTTG 135</a>	1.0	Unidrive Classic Size 5	Ot Pc or AdOI Faults	
<a href="#">CTTG 136</a>	1.4	All Drives	Input Power Problems	
<a href="#">CTTG 137</a>	1.0	Focus 1	Basic Checks for Focus 1	
<a href="#">CTTG 138</a>	1.2	Commander SK	Commander SK HF Trip Codes	
<a href="#">CTTG 139</a>	1.0	Commander CDE	Commander CDE Trip Codes	
<a href="#">CTTG 140</a>	1.0	Unidrive SP	Option Module Trip Codes	
<a href="#">CTTG 141</a>	1.0	GP20/Affinity	Option Module Trip Codes	
<a href="#">CTTG 142</a>	1.0	Commander SK/HSK	Option Module Trip Codes	
<a href="#">CTTG 143</a>	1.1	Commander SK/HSK	Common Trip Codes	
<a href="#">CTTG 144</a>	1.0			
<a href="#">CTTG 145</a>	1.0	Unidrive Classic/SP	Resolver Troubleshooting	
<a href="#">CTTG 146</a>	1.0	GP20/ SP/ SK	Troubleshooting fans on size 5 & 6	
<a href="#">CTTG 147</a>	1.1	FXM5	FXM5 Troubleshooting Guidance	
<a href="#">CTTG 148</a>	1.0	Quantum III Size 1	Causes/Remedies for Blown Fuses	
<a href="#">CTTG 149</a>	1.0	Quantum III Size 2	Causes/Remedies for Blown Fuses	
<a href="#">CTTG 150</a>	1.0	Quantum III Size 3	Causes/Remedies for Blown Fuses	

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**Comment [ 27]:** These trip codes are internal to the drive and are not caused by the customers. With most of these trips, if the Drive is powered down and powered back up, the trip will be cleared and the Drive will run as normal.

**Comment [ 28]:** When commissioning a drive it is advantageous to achieve stable rotation of the motor prior to advanced programming. This is important to ensure the drive, motor, and feed back device are working accordingly. Once advanced programming has been added... [26]

**Comment [ 29]:** On Unidrive Classics , when a UD7x generated trip occurs, the display will show... [27]

**Comment [ 30]:** An HF (hardware fault) can be generated by the drive if there is a problem with the software... [28]

**Comment [ 31]:** When a specific button is depressed, the two connection pins shown should... [29]

**Comment [ 32]:** The Oh2 trip indicates the internal thermistor has detected a temperature in excess of... [30]

**Comment [ 33]:** The O.ht2 trip indicates that an internal temperature-sensing device has detected a temperature... [31]

**Comment [ 34]: Problem:** Over temperature trips (Ot HS n) on UNI 5 power modules cannot be... [32]

**Comment [ 35]:** No display and the drive is blowing fuses on the MDA6 Power board... [33]

**Comment [ 36]:** AdOI may be displayed *without* the IN96 board OVERTEMP LED lighting. A... [34]

**Comment [ 37]:** In order to gain an insight into the possible causes of recurring or occasional drive... [35]

**Comment [ 38]:** This Troubleshooting Guide provides the technician with basic checks to... [36]

**Comment [ 39]:** These HF (Hardware Fault) trip codes are internal to the Drive and are... [37]

**Comment [ 40]:** To make the troubleshooting process easier a chart was created to link the... [38]

**Comment [ 41]:** Slot error codes are different for the various application modules that are... [39]

**Comment [ 42]:** Slot error codes are different for the various application modules that are... [40]

**Comment [ 43]:** Slot error codes are different for the various application modules that are... [41]

**Comment [ 44]: Common Commander SK Trip Codes** Possible Causes & Remedies... [42]

# CTTG Directory of Troubleshooting Guides

## Mentor II & Quantum III Troubleshooting Guides

Troubleshooting Guide #	Rev	Drive Family	Description	
<a href="#">CTTG 100</a>	1.2	MII/QIII Size 1	Dark Display/Lights Out	<input type="checkbox"/>
<a href="#">CTTG 102</a>	1.0	Mentor II/Quantum III	Continuous State of Reset	<input type="checkbox"/>
<a href="#">CTTG 103</a>	1.3	Mentor II/Quantum III	EEF Trip Code	<input type="checkbox"/>
<a href="#">CTTG 104</a>	1.3	Mentor II/Quantum III	FdL Trip Code	<input type="checkbox"/>
<a href="#">CTTG 105</a>	1.3	Mentor II/Quantum III	AOC Trip Code	<input type="checkbox"/>
<a href="#">CTTG 106</a>	1.1	Mentor II/Quantum III	FbL Trip Code	<input type="checkbox"/>
<a href="#">CTTG 107</a>	1.1	Mentor II/Quantum III	Oh Trip Code	<input type="checkbox"/>
<a href="#">CTTG 110</a>	1.0	Quantum III	Will Not Run	<input type="checkbox"/>
<a href="#">CTTG 114</a>	1.1	Mentor II	Will Not Run	<input type="checkbox"/>
<a href="#">CTTG 116</a>	1.1	Mentor II/Quantum III	AOP Trip Code	<input type="checkbox"/>
<a href="#">CTTG 117</a>	1.3	Quantum III Sizes 1-3	Et Trip Code	<input type="checkbox"/>
<a href="#">CTTG 118</a>	1.1	Mentor II/Quantum III	It Trip Code	<input type="checkbox"/>
<a href="#">CTTG 119</a>	1.3	Mentor II/Quantum III	PS Trip Code	<input type="checkbox"/>
<a href="#">CTTG 120</a>	1.0	Mentor II/Quantum III	SL Trip Code	<input type="checkbox"/>
<a href="#">CTTG 123</a>	1.1	Mentor II/Quantum III	FOC Trip Code	<input type="checkbox"/>
<a href="#">CTTG 124</a>	1.2	Mentor II/Quantum III	FOC Trip Code	<input type="checkbox"/>
<a href="#">CTTG 130</a>	1.0	Mentor II/Quantum III	Membrane Keypad Connections	<input type="checkbox"/>
<a href="#">CTTG 134</a>	1.0	Mentor II/Quantum III	Determining a Faulty Field Bridge Rectifier	<input type="checkbox"/>
<a href="#">CTTG 136</a>	1.4	All Drives	Input Power Problems	<input type="checkbox"/>
<a href="#">CTTG 144</a>	1.0			
<a href="#">CTTG 147</a>	1.1	FXM5	FXM5 Troubleshooting Guidance	
<a href="#">CTTG 148</a>	1.0	Quantum III Size 1	Causes/Remedies for Blown Fuses	
<a href="#">CTTG 149</a>	1.0	Quantum III Size 2	Causes/Remedies for Blown Fuses	
<a href="#">CTTG 150</a>	1.0	Quantum III Size 3	Causes/Remedies for Blown Fuses	

- Not yet released

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**Comment [ 45]:** The Mentor II/Quantum III drives may occasionally fail to light up the LED display. There are several causes that could be attributed to this condition. This document will help to isolate the reason for the failure.

**Comment [ 46]:** Drive is in continuous RESET ( the display continues to cycle through self test )

**Comment [ 47]:** The EEF ( Electrically Erasable Programmable Read Only Memory Failure) failure is an indication that the memory area that holds the drive parameter (... [43])

**Comment [ 48]:** FdL Trip Code on display or 118 in parameter #10.25 trip log, is an indication of the (... [44])

**Comment [ 49]:** The AOC ( Armature Over Current) trip is an instantaneous protection f (... [45])

**Comment [ 50]:** An FbL - Feedback Loss Trip (or 119 in parameter #10.25 trip log) occ (... [46])

**Comment [ 51]:** The Oh (Over Heated) thermal trip (or 107 in parameter #10.25 trip log ) no (... [47])

**Comment [ 52]:** The QIII has digital inputs that need to be activated to allow the drive to run. The inp (... [48])

**Comment [ 53]:** The Mentor II has digital inputs that need to be activated to allow the drive to run. The i (... [49])

**Comment [ 54]:** The drive displays AOP or a 126 code appears in the trip log. The trip log is located (... [50])

**Comment [ 55]:** The drive displays Et and will not This can happen during initial (... [51])

**Comment [ 56]:** The drive shows It in the display window or in the trip log (#10.25) you see the trip c (... [52])

**Comment [ 57]:** The Mentor II and Quantum III drives have built in monitoring for the internal sup (... [53])

**Comment [ 58]:** The MENTOR II and QUANTUM III drives have a built in feature for monitoring the 3 (... [54])

**Comment [ 59]:** When a drive trips on FOC ( Field Over Current, Code #106 ) it indicates the electrica (... [55])

**Comment [ 60]:** When a drive trips on FOC ( Field Over Current, Code #106) it indicates the electrica (... [56])





**Comment [ 61]:** When a specific button is depressed, the two connection pins shown should (... [57])

**Comment [ 62]:** No display and the drive is blowing fuses on the MDA6 Power board. (... [58])

**Comment [ 63]:** In order to gain an insight into the possible causes of recurring or occassional drive (... [59])

# CTTG Directory of Troubleshooting Guides

## Focus 1 & Focus 3 Troubleshooting Guides

Troubleshooting Guide #	Rev	Drive Family	Description	
<a href="#">CTTG 115</a>	1.0	Focus 3N	Bench Test	
<a href="#">CTTG 136</a>	1.4	All Drives	Input Power Problems	
<a href="#">CTTG 137</a>	1.0	Focus 1	Basic Checks for Focus 1	

**Comment [ 64]:** This Troubleshooting Guide is pertinent to Focus 3N Non Regen DC Drives
















**Comment [ 65]:** In order to gain an insight into the possible causes of recurring or occasional drive failures, we've created a questionnaire of common questions we find ourselves asking customers when we suspect input power problems.

**Comment [ 66]:** This Troubleshooting Guide provides the technician with basic checks to insure the Run relay is ok. It also provides the technician with basic ohmic check information to determine if the Focus 1 power elements are ok or not.

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## Affinity, Commander GP20, Unidrive Classic & Unidrive SP Troubleshooting Guides

Troubleshooting Guide #	Rev	Drive Family	Description	
<a href="#">CTTG 101</a>	1.3	UNI(SP) Sizes 1-4	It.AC trip	
<a href="#">CTTG 108</a>	1.1	UNI(SP) Sizes 1-4	OU trip	
<a href="#">CTTG 109</a>	1.1	UNI(SP) Sizes 1-4	OI.AC trip	
<a href="#">CTTG 111</a>	1.0	Unidrive SP	Will Not Run	
<a href="#">CTTG 121</a>	1.0	Unidrive Classic Size 5	Fault Isolation	
<a href="#">CTTG 122</a>	1.2	Unidrive SP	It.br Trip Code	
<a href="#">CTTG 127</a>	1.1	Unidrive SP	Unidrive SP & EZmotion	
<a href="#">CTTG 129</a>	1.0	Unidrive SP	Unidrive SP & EZ Motion SLX.HF	
<a href="#">CTTG 132</a>	1.0	Unidrive SP	O.ht2 Trips	
<a href="#">CTTG 136</a>	1.4	All Drives	Input Power Problems	
<a href="#">CTTG 140</a>	1.0	Unidrive SP	Option Module Trip Codes	
<a href="#">CTTG 141</a>	1.0	GP20/Affinity	Option Module Trip Codes	
<a href="#">CTTG 145</a>	1.0	Unidrive Classic/SP	Resolver Troubleshooting	
<a href="#">CTTG 146</a>	1.0	GP20/ SP/ SK	Troubleshooting fans on size 5 & 6	

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**Comment [ 67]:** The It.AC trip indicates the output overload accumulator has timed out. This can be viewed at #4.19 and is in units of %. When it reaches 100% the drive will trip out. Parameter #4.19 is a percentage of calculated maximum motor temperature. The thermal time constant is set up at parameter #4.15 and is units of seconds. If #4.15 is increased it adjusts the thermal model of the motor so that the drive ... [60]

**Comment [ 68]:** There are several events that can cause a drive to OU trip. We must first determine when the drive is tripping. Is the drive tripping during deceleration, j ... [61]

**Comment [ 69]:** The drive will trip OI.AC ( Over Current. AC ) if the output current reaches 225% of rated full load current. The drives rated full load current is displa ... [62]

**Comment [ 70]:** The Unidrive SP can be enabled to run in several ways. The drive can use digital inputs, keypad, or a field buss networks to give the OK to run ... [63]

**Comment [ 71]:** When there are multiple power modules involved a fault may need to be isolated. This document can also be used for instructions on how to move th ... [64]

**Comment [ 72]:** The trip code It.br (Current x time on Brake) occurs when the I t modeling of the braking circuit timed out.

**Comment [ 73]:** When commissioning a drive it is advantageous to achieve stable rotation of the motor prior to advanced programming. This ... [65]

**Comment [ 74]:** An HF (hardware fault) can be generated by the drive if there is a problem with the solutions module. The drive will display the trip as SLX.HF. It is sometimes pe ... [66]

**Comment [ 75]:** The O.ht2 trip indicates that an internal temperature-sensing device has detected the heatsink temperature is above safe operating temperature. It is co ... [67]

**Comment [ 76]:** In order to gain an insight into the possible causes of recurring or occasional drive failures, we've created a questionnaire of common questions we find ou ... [68]

**Comment [ 77]:** Slot error codes are different for the various application modules that are supported by the drive. This troubleshooting guide will ass ... [69]

**Comment [ 78]:** Slot error codes are different for the various application modules that are supported by the drive. This troubleshooting guide will ass ... [70]

## Unidrive Classic Troubleshooting Guides

Troubleshooting Guide #	Rev	Drive Family	Description	
<a href="#">CTTG 101</a>	1.3	UNI(SP) Sizes 1-4	It.AC trip	
<a href="#">CTTG 108</a>	1.1	UNI(SP) Sizes 1-4	OU trip	
<a href="#">CTTG 109</a>	1.1	UNI(SP) Sizes 1-4	OI.AC trip	
<a href="#">CTTG 113</a>	1.0	Unidrive	Will Not Run	
<a href="#">CTTG 121</a>	1.0	Unidrive Classic Size 5	Fault Isolation	
<a href="#">CTTG 125</a>	1.0	Unidrive Classic	HF Fault Trip Codes	
<a href="#">CTTG 128</a>	1.0	Unidrive Classic	Unidrive UD7x Trip Codes	
<a href="#">CTTG 131</a>	1.0	Unidrive Classic	Oh2 Trips	
<a href="#">CTTG 136</a>	1.4	All Drives	Input Power Problems	
<a href="#">CTTG 145</a>	1.0	Unidrive Classic/SP	Resolver Troubleshooting	

• Not yet released

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## Unidrive Size 5 Troubleshooting Guides

Troubleshooting Guide #	Rev	Drive Family	Description	
<a href="#">CTTG 121</a>	1.0	Unidrive Classic Size 5	Fault Isolation	
<a href="#">CTTG 133</a>	1.0	Unidrive Classic Size 5	Ot HS <sub>n</sub> Faults	
<a href="#">CTTG 135</a>	1.0	Unidrive Classic Size 5	Ot Pc or AdOI Faults	
<a href="#">CTTG 136</a>	1.4	All Drives	Input Power Problems	

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**Comment [ 79]:** The It.AC trip indicates the output overload accumulator has timed out. This can be viewed at #4.19 and is in units of %. When it reaches 100% the drive will trip out. Parameter #4.19 is a percentage of calculated max... [71]

**Comment [ 80]:** There are several events that can cause a drive to **OU** trip. We must first determine when the drive is tripping. Is the drive tripping during deceleration, j... [72]

**Comment [ 81]:** The drive will trip **OI.AC** ( Over Current. AC ) if the output current reaches 225% of rated full load current. The drives rated full load current is displa... [73]

**Comment [ 82]:** The Unidrive can be enabled to run in several ways. They can use digital inputs, keypad, or a field buss network to give the OK to run. The drive will display ir... [74]

**Comment [ 83]:** When there are multiple power modules involved a fault may need to be isolated. This document can also be used for instructions on how to move th... [75]

**Comment [ 84]:** **Hardware Faults are typically fatal. If powering down and letting the drive sit for 5 minutes before re-application of Power does not clear the HF**... [76]

**Comment [ 85]:** On Unidrive Classics , when a UD7x generated trip occurs, the display will show the trip code as "tr...".

**Comment [ 86]:** The Oh2 trip indicates the internal thermistor has detected a temperature in excess of 201°F (94°C) at the heatsink. It is common to see the word **hot** ... [77]

**Comment [ 87]:** In order to gain an insight into the possible causes of recurring or occasional drive failures, we've created a questionnaire of common questions we find ou... [78]





**Comment [ 88]:** When there are multiple power modules involved a fault may need to be isolated. This document can also be used for instructions on how to move th... [79]

**Comment [ 89]:** **Problem:** Over temperature trips (Ot HS<sub>n</sub>) on UNI 5 power modules cannot be differentiated between a properly operating thermistor and a de... [80]

**Comment [ 90]:** **AdOI** may be displayed *without* the IN96 board OVERTEMP LED lighting. A pull-up resistor associated with the overtemperature trip circuit th... [81]

**Comment [ 91]:** In order to gain an insight into the possible causes of recurring or occasional drive failures, we've created a questionnaire of common questions we find ou... [82]

## Commander SE Troubleshooting Guides

Troubleshooting Guide #	Rev	Drive Family	Description	
<a href="#">CTTG 112</a>	1.1	Commander SE	Will Not Run	
<a href="#">CTTG 126</a>	1.0	Commander SE	HF Fault Trip Codes	
<a href="#">CTTG 136</a>	1.4	All Drives	Input Power Problems	

**Comment [ 92]:** The Commander SE can be operated by activating digital inputs. The keypad or a field buss network can also be used. In terminal mode the digital inputs on the control terminal strip must be taken high to +24VDC on pin 7 or 14. The drive can be configured for negative logic by setting parameter #0.34 to OFF. If negative logic is selected the digital inputs must be taken low to 0vdc on pin 1 or 4.

**Comment [ 93]:** These trip codes are internal to the drive and are not caused by the customers. With most of these trips, if the Drive is powered down and powered back up, the trip will be cleared and the Drive will run as normal.

**Comment [ 94]:** In order to gain an insight into the possible causes of recurring or occasional drive failures, we've created a questionnaire of common questions we find ourselves asking customers when we suspect input power problems.

**Comment [ 95]:** In order to gain an insight into the possible causes of recurring or occasional drive failures, we've created a questionnaire of common questions we find ourselves asking customers when we suspect input power problems.






**Comment [ 96]:** These HF (Hardware Fault) trip codes are internal to the Drive and are typically not caused by the customer. Sometimes an HF fault may occur as a result of a high electrical noise spike or vibration shock.

**Comment [ 97]:** Slot error codes are different for the various application modules that are supported by the drive. This troubleshooting guide will assist in properly identifying what module you have and finding the corresponding trip code details relevant to that module.

**Comment [ 98]:** [Common Commander SK Trip Codes](#)  
Possible Causes & Remedies

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## Commander SK Troubleshooting Guides

Troubleshooting Guide #	Rev	Drive Family	Description	
<a href="#">CTTG 136</a>	1.4	All Drives	Input Power Problems	
<a href="#">CTTG 138</a>	1.2	Commander SK	Commander SK HF Trip Codes	
<a href="#">CTTG 142</a>	1.0	Commander SK/HSK	Option Module Trip Codes	
<a href="#">CTTG 143</a>	1.1	Commander SK/HSK	Common Trip Codes	
<a href="#">CTTG 146</a>	1.0	GP20/ SP/ SK	Troubleshooting fans on size 5 & 6	

- Not yet released

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Page 2: [1] Comment [ 2]                      Technical Support                      3/11/2008 8:28:00 AM

The lt.AC trip indicates the output overload accumulator has timed out. This can be viewed at #4.19 and is in units of %. When it reaches 100% the drive will trip out. Parameter #4.19 is a percentage of calculated maximum motor temperature. The thermal time constant is set up at parameter #4.15 and is units of seconds. If #4.15 is increased it adjusts the thermal model of the motor so that the drive will run longer at high currents before the drive trips out. The point at which the accumulator at #4.19 starts to increase is when #4.01 (Current Magnitude) exceeds #5.07 (Motor rated current).

Page 2: [2] Comment [ 3]                      Technical Support                      3/11/2008 8:29:00 AM

Drive is in continuous RESET ( the display continues to cycle through self test )

Page 2: [3] Comment [ 4]                      Technical Support                      3/11/2008 8:29:00 AM

The EEF ( **E**lectrically **E**rasable Programmable Read Only Memory **F**ailure) failure is an indication that the memory area that holds the drive parameters is faulty in some manner. This fault could be caused by a corruption of the stored data or it could be a genuine device failure. The integrity of this data is checked at each power-up or cold boot (hard reset). If the drive microcomputer detects a discrepancy it indicates EEF and trips the drive since it could produce unreliable drive operation.

Page 2: [4] Comment [ 5]                      Technical Support                      3/11/2008 8:31:00 AM

**FdL** Trip Code on display or 118 in parameter #10.25 trip log, is an indication of the drive detecting a **Field Loss** condition.

Page 2: [5] Comment [ 6]                      Technical Support                      3/11/2008 8:31:00 AM

The **AOC** (**A**rmature **O**ver **C**urrent) trip is an instantaneous protection fault activated by excessive current in the armature circuit. The trip is activated when the current reaches about 300% of the full load rating. There are several causes for this trip as well as several troubleshooting techniques to isolate the problem.

Page 2: [6] Comment [ 7]                      Technical Support                      3/11/2008 8:33:00 AM

An **FbL** - **F**eedback **L**oss Trip (or 119 in parameter #10.25 trip log) occurs when the drive senses a loss in the speed feedback signal. The Mentor II and Quantum III drives support AVF ( Armature Voltage Feedback – inherent ), tachometer, and encoder feedback.

Page 2: [7] Comment [ 8]                      Technical Support                      3/11/2008 8:36:00 AM

The **Oh** (**O**ver **H**eated) thermal trip (or 107 in parameter #10.25 trip log ) normally results due to a high temperature condition as read from a heat sink mounted thermistor. The thermistor is a resistive device that changes resistance as a function of temperature. By measuring the resistance ( or the voltage in a simple voltage-divided network ) an approximate temperature can be derived.

Page 2: [8] Comment [ 9]                      Technical Support                      4/30/2008 10:52:00 AM

There are several events that can cause a drive to **OU** trip. We must first determine when the drive is tripping. Is the drive tripping during deceleration, just after acceleration, constant motoring, or when the motor is idle?

Page 2: [9] Comment [ 10]                      Technical Support                      3/11/2008 8:38:00 AM

The drive will trip **OI.AC** ( Over Current. AC ) if the output current reaches 225% of rated full load current. The drives rated full load current is displayed at #0.32 in the SP and #0.33 in the Unidrive Classic.

Page 2: [10] Comment [ 11]                      Technical Support                      3/11/2008 8:39:00 AM

The QIII has digital inputs that need to be activated to allow the drive to run. The inputs are located on the MDA2(B) interface board. This board can be found under the access cover on the front panel of the drive. The AC Interface board and the Logic board control these inputs on QIII drives.

Page 2: [11] Comment [ 12]                      Technical Support                      3/11/2008 8:41:00 AM

The Unidrive SP can be enabled to run in several ways. The drive can use digital inputs, keypad, or a field buss networks to give the OK to run. The drive will display inh, rdy, or run depending on the given commands. The drive can be configured to use positive or negative logic.

Page 2: [12] Comment [ 13]                      Technical Support                      3/11/2008 8:42:00 AM

The Commander SE can be operated by activating digital inputs. The keypad or a field buss network can also be used. In terminal mode the digital inputs on the control terminal strip must be taken high to +24VDC on pin 7 or 14. The drive can be configured for negative logic by setting parameter #0.34 to OFF. If negative logic is selected the digital inputs must be taken low to 0vdc on pin 1 or 4.

Page 2: [13] Comment [ 14]                      Technical Support                      3/11/2008 8:43:00 AM

The Unidrive can be enabled to run in several ways. They can use digital inputs, keypad, or a field buss network to give the OK to run. The drive will display inh, rdy, or run depending on the command applied. The drive can be configured to use positive or negative logic.

Page 2: [14] Comment [ 15]                      Technical Support                      3/11/2008 8:43:00 AM

The Mentor II has digital inputs that need to be activated to allow the drive to run. The inputs are located on the MDA2(B) interface board. This board can be found under the access cover on the front panel of the drive. The MII will need external control to activate the digital inputs.

Page 2: [15] Comment [ 16]                      Technical Support                      3/11/2008 8:44:00 AM

This Troubleshooting Guide is pertinent to Focus 3N Non Regen DC Drives

Page 2: [16] Comment [ 17]                      Technical Support                      3/11/2008 8:45:00 AM

The drive displays **AOP** or a 126 code appears in the trip log. The trip log is located at #10.25 - #10.28. These are indications of the drive detecting an **Armature OPen Circuit** condition. The **AOP** trip indicates that the SCR firing angle had advanced to a high level for a period of time but no current feedback had been detected.

Page 2: [17] Comment [ 18]                      Technical Support                      3/11/2008 8:46:00 AM

The drive displays **Et** and will not  
This can happen during initial commissioning

Page 2: [18] Comment [ 19]                      Technical Support                      3/11/2008 8:47:00 AM

The drive shows **It** in the display window or in the trip log (#10.25) you see the trip code 122. This trip can be caused by many different things and with the right tools, discovering the cause will be made easier.

Page 2: [19] Comment [ 20]                      Technical Support                      3/11/2008 8:49:00 AM

The Mentor II and Quantum III drives have built in monitoring for the internal supply voltages. If one or more of the internal power supplies are out of tolerance the drive will display a **PS** trip. This may occur on power up or during operation.

Page 2: [20] Comment [ 21]                      Technical Support                      3/11/2008 8:52:00 AM

The MENTOR II and QUANTUM III drives have a built in feature for monitoring the 3-phase AC input to the drive. If one or more of the power (input) supply phases is open circuit the drive will trip **SL**.

Page 2: [21] Comment [ 22]                      Technical Support                      3/11/2008 9:38:00 AM

When there are multiple power modules involved a fault may need to be isolated. This document can also be used for instructions on how to move the Control Pod to another power module in an effort to isolate a fault condition.

Page 2: [22] Comment [ 23]                      Technical Support                      3/11/2008 8:54:00 AM

The trip code **It.br** (Current x time on Brake) occurs when the  $I^2 t$  modeling of the braking circuit timed out.

Page 2: [23] Comment [ 24]                      Technical Support                      3/11/2008 8:54:00 AM

When a drive trips on **FOC** ( **F**ield **O**ver **C**urrent, Code #106 ) it indicates the electrical current in the motor field has exceeded an acceptable level. This can be caused by internal problems in the drive or external problems in the motor.

Page 2: [24] Comment [ 25]                      Technical Support                      3/11/2008 8:55:00 AM

When a drive trips on **FOC** ( **F**ield **O**ver **C**urrent, Code #106) it indicates the electrical current in the motor field has exceeded an acceptable level. This

can be caused by internal problems in the drive or external problems in the motor.

Page 2: [25] Comment [ 26]                      Technical Support                      3/11/2008 8:56:00 AM

**Hardware Faults are typically fatal. If powering down and letting the drive sit for 5 minutes before re-application of Power does not clear the HF Fault it would require Drive repair.**

Page 3: [26] Comment [ 28]                      Technical Support                      3/11/2008 9:03:00 AM

When commissioning a drive it is advantageous to achieve stable rotation of the motor prior to advanced programming. This is important to ensure the drive, motor, and feed back device are working accordingly. Once advanced programming has been added to the drive and operation is not as you intended, it may prove more difficult to diagnose any problems that arise. Knowing the motor, drive, and feedback device are operating properly is a great advantage.

Page 3: [27] Comment [ 29]                      Technical Support                      3/11/2008 9:04:00 AM

On Unidrive Classics , when a UD7x generated trip occurs, the display will show the trip code as "tr\_\_".

Page 3: [28] Comment [ 30]                      Technical Support                      3/11/2008 9:05:00 AM

An **HF** (hardware fault) can be generated by the drive if there is a problem with the solutions module. The drive will display the trip as SLX.HF. It is sometimes possible to correct this trip without replacing the module.

Page 3: [29] Comment [ 31]                      Technical Support                      3/11/2008 9:06:00 AM

When a specific button is depressed, the two connection pins shown should read less than 20 ohms, otherwise they should be an open circuit.

Page 3: [30] Comment [ 32]                      Technical Support                      3/11/2008 9:06:00 AM

The **Oh2** trip indicates the internal thermistor has detected a temperature in excess of 201°F (94°C) at the heatsink. It is common to see the word **hot** flashing on the display prior to the **Oh2** trip. The **hot** indicates the heatsink temperature has crossed the 194° F (90° C) threshold and is getting close to the maximum allowed temperature.

Page 3: [31] Comment [ 33]                      Technical Support                      3/11/2008 9:07:00 AM

The **O.ht2** trip indicates that an internal temperature-sensing device has detected the heatsink temperature is above safe operating temperature. It is common to see the word **hot** flashing on the display prior to the **O.ht2** trip. The **hot** indicates the heatsink temperature in approaching unsafe temperature levels.

Page 3: [32] Comment [ 34]                      Technical Support                      3/11/2008 9:08:00 AM

**Problem:** Over temperature trips (Ot HS n) on UNI 5 power modules cannot be differentiated between a properly operating thermistor and a defective one.

**Solution:** By measuring the DC voltage or resistance across each thermistor, the technician can readily tell if there is a true over temperature condition and/or a defective thermistor.

Page 3: [33] Comment [ 35]                      Technical Support                      3/11/2008 9:09:00 AM  
No display and the drive is blowing fuses on the MDA6 Power board.

Page 3: [34] Comment [ 36]                      Technical Support                      3/11/2008 9:40:00 AM  
AdOI may be displayed *without* the IN96 board OVERTEMP LED lighting. A pull-up resistor associated with the overtemperature trip circuit that has too high a value may cause this anomaly. This results in the trip circuit outputting a voltage between “no trip” and “full trip” values resulting in AdOI being displayed.

Page 3: [35] Comment [ 37]                      Technical Support                      3/11/2008 9:10:00 AM  
In order to gain an insight into the possible causes of recurring or occasional drive failures, we’ve created a questionnaire of common questions we find ourselves asking customers when we suspect input power problems.

Page 3: [36] Comment [ 38]                      Technical Support                      3/11/2008 9:16:00 AM  
This Troubleshooting Guide provides the technician with basic checks to insure the Run relay is ok. It also provides the technician with basic ohmic check information to determine if the Focus 1 power elements are ok or not.

Page 3: [37] Comment [ 39]                      Technical Support                      3/11/2008 9:17:00 AM  
These HF (Hardware Fault) trip codes are internal to the Drive and are typically not caused by the customer. Sometimes an HF fault may occur as a result of a high electrical noise spike or vibration shock.

Page 3: [38] Comment [ 40]                      Technical Support                      3/11/2008 9:18:00 AM  
To make the troubleshooting process easier a chart was created to link the type of trip with the symptom.

Page 3: [39] Comment [ 41]                      Technical Support                      3/11/2008 9:19:00 AM  
Slot error codes are different for the various application modules that are supported by the drive. This troubleshooting guide will assist in properly identifying what module you have and finding the corresponding trip code details relevant to that module.

Page 3: [40] Comment [ 42]                      Technical Support                      3/11/2008 9:20:00 AM  
Slot error codes are different for the various application modules that are supported by the drive. This troubleshooting guide will assist in properly identifying what module you have and finding the corresponding trip code details relevant to that module.

Page 3: [41] Comment [ 43]                      Technical Support                      3/11/2008 9:21:00 AM  
Slot error codes are different for the various application modules that are supported by the drive. This troubleshooting guide will assist in properly

identifying what module you have and finding the corresponding trip code details relevant to that module.

Page 3: [42] Comment [ 44]                      Technical Support                      3/11/2008 9:22:00 AM

### **Common Commander SK Trip Codes**

#### Possible Causes & Remedies

Page 4: [43] Comment [ 47]                      Technical Support                      3/11/2008 9:23:00 AM

The EEF ( **E**lectrically **E**rasable Programmable Read Only Memory **F**ailure) failure is an indication that the memory area that holds the drive parameters is faulty in some manner. This fault could be caused by a corruption of the stored data or it could be a genuine device failure. The integrity of this data is checked at each power-up or cold boot (hard reset). If the drive microcomputer detects a discrepancy it indicates EEF and trips the drive since it could produce unreliable drive operation.

Page 4: [44] Comment [ 48]                      Technical Support                      3/11/2008 9:23:00 AM

**FdL** Trip Code on display or 118 in parameter #10.25 trip log, is an indication of the drive detecting a **Field Loss** condition.

Page 4: [45] Comment [ 49]                      Technical Support                      3/11/2008 9:23:00 AM

The **AOC** (**A**rmature **O**ver **C**urrent) trip is an instantaneous protection fault activated by excessive current in the armature circuit. The trip is activated when the current reaches about 300% of the full load rating. There are several causes for this trip as well as several troubleshooting techniques to isolate the problem.

Page 4: [46] Comment [ 50]                      Technical Support                      3/11/2008 9:23:00 AM

An **FbL** - **F**eedback **L**oss Trip (or 119 in parameter #10.25 trip log) occurs when the drive senses a loss in the speed feedback signal. The Mentor II and Quantum III drives support AVF ( Armature Voltage Feedback – inherent ), tachometer, and encoder feedback.

Page 4: [47] Comment [ 51]                      Technical Support                      3/11/2008 9:23:00 AM

The **Oh** (**O**ver **H**eated) thermal trip (or 107 in parameter #10.25 trip log ) normally results due to a high temperature condition as read from a heat sink mounted thermistor. The thermistor is a resistive device that changes resistance as a function of temperature. By measuring the resistance ( or the voltage in a simple voltage-divided network ) an approximate temperature can be derived.

Page 4: [48] Comment [ 52]                      Technical Support                      3/11/2008 9:23:00 AM

The QIII has digital inputs that need to be activated to allow the drive to run. The inputs are located on the MDA2(B) interface board. This board can be found under the access cover on the front panel of the drive. The AC Interface board and the Logic board control these inputs on QIII drives.

Page 4: [49] Comment [ 53]                      Technical Support                      3/11/2008 9:24:00 AM

The Mentor II has digital inputs that need to be activated to allow the drive to run. The inputs are located on the MDA2(B) interface board. This board can be found under the access cover on the front panel of the drive. The MII will need external control to activate the digital inputs.

Page 4: [50] Comment [ 54]                      Technical Support                      3/11/2008 9:24:00 AM

The drive displays **AOP** or a 126 code appears in the trip log. The trip log is located at #10.25 - #10.28. These are indications of the drive detecting an **Armature OPen Circuit** condition. The **AOP** trip indicates that the SCR firing angle had advanced to a high level for a period of time but no current feedback had been detected.

Page 4: [51] Comment [ 55]                      Technical Support                      3/11/2008 9:24:00 AM

The drive displays **Et** and will not  
This can happen during initial commissioning

Page 4: [52] Comment [ 56]                      Technical Support                      3/11/2008 9:24:00 AM

The drive shows **It** in the display window or in the trip log (#10.25) you see the trip code 122. This trip can be caused by many different things and with the right tools, discovering the cause will be made easier.

Page 4: [53] Comment [ 57]                      Technical Support                      3/11/2008 9:24:00 AM

The Mentor II and Quantum III drives have built in monitoring for the internal supply voltages. If one or more of the internal power supplies are out of tolerance the drive will display a **PS** trip. This may occur on power up or during operation.

Page 4: [54] Comment [ 58]                      Technical Support                      3/11/2008 9:24:00 AM

The MENTOR II and QUANTUM III drives have a built in feature for monitoring the 3-phase AC input to the drive. If one or more of the power (input) supply phases is open circuit the drive will trip **SL**.

Page 4: [55] Comment [ 59]                      Technical Support                      3/11/2008 9:25:00 AM

When a drive trips on **FOC** ( **Field Over Current**, Code #106 ) it indicates the electrical current in the motor field has exceeded an acceptable level. This can be caused by internal problems in the drive or external problems in the motor.

Page 4: [56] Comment [ 60]                      Technical Support                      3/11/2008 9:25:00 AM

When a drive trips on **FOC** ( **Field Over Current**, Code #106) it indicates the electrical current in the motor field has exceeded an acceptable level. This can be caused by internal problems in the drive or external problems in the motor.

Page 4: [57] Comment [ 61]                      Technical Support                      3/11/2008 9:25:00 AM

When a specific button is depressed, the two connection pins shown should read less than 20 ohms, otherwise they should be an open circuit.

Page 4: [58] Comment [ 62]                      Technical Support                      3/11/2008 9:25:00 AM

No display and the drive is blowing fuses on the MDA6 Power board.

Page 4: [59] Comment [ 63]                      Technical Support                      3/11/2008 9:26:00 AM

In order to gain an insight into the possible causes of recurring or occasional drive failures, we've created a questionnaire of common questions we find ourselves asking customers when we suspect input power problems.

Page 6: [60] Comment [ 67]                      Technical Support                      3/11/2008 9:27:00 AM

The It.AC trip indicates the output overload accumulator has timed out. This can be viewed at #4.19 and is in units of %. When it reaches 100% the drive will trip out. Parameter #4.19 is a percentage of calculated maximum motor temperature. The thermal time constant is set up at parameter #4.15 and is units of seconds. If #4.15 is increased it adjusts the thermal model of the motor so that the drive will run longer at high currents before the drive trips out. The point at which the accumulator at #4.19 starts to increase is when #4.01 (Current Magnitude) exceeds #5.07 (Motor rated current).

Page 6: [61] Comment [ 68]                      Technical Support                      4/30/2008 10:52:00 AM

There are several events that can cause a drive to **OU** trip. We must first determine when the drive is tripping. Is the drive tripping during deceleration, just after acceleration, constant motoring, or when the motor is idle?

Page 6: [62] Comment [ 69]                      Technical Support                      3/11/2008 9:28:00 AM

The drive will trip **OI.AC** ( Over Current. AC ) if the output current reaches 225% of rated full load current. The drives rated full load current is displayed at #0.32 in the SP and #0.33 in the Unidrive Classic.

Page 6: [63] Comment [ 70]                      Technical Support                      3/11/2008 9:28:00 AM

The Unidrive SP can be enabled to run in several ways. The drive can use digital inputs, keypad, or a field buss networks to give the OK to run. The drive will display inh, rdy, or run depending on the given commands. The drive can be configured to use positive or negative logic.

Page 6: [64] Comment [ 71]                      Technical Support                      3/11/2008 9:40:00 AM

When there are multiple power modules involved a fault may need to be isolated. This document can also be used for instructions on how to move the Control Pod to another power module in an effort to isolate a fault condition.

Page 6: [65] Comment [ 73]                      Technical Support                      3/11/2008 9:29:00 AM

When commissioning a drive it is advantageous to achieve stable rotation of the motor prior to advanced programming. This is important to ensure the drive, motor, and feed back device are working accordingly. Once advanced programming has been added to the drive and operation is not as you intended, it may prove more difficult to diagnose any problems that arise. Knowing the motor, drive, and feedback device are operating properly is a great advantage.

Page 6: [66] Comment [ 74]                      Technical Support                      3/11/2008 9:29:00 AM

An **HF** (hardware fault) can be generated by the drive if there is a problem with the solutions module. The drive will display the trip as SLX.HF. It is sometimes possible to correct this trip without replacing the module.

Page 6: [67] Comment [ 75]                      Technical Support                      3/11/2008 9:29:00 AM

The **O.ht2** trip indicates that an internal temperature-sensing device has detected the heatsink temperature is above safe operating temperature. It is common to see the word **hot** flashing on the display prior to the **O.ht2** trip. The **hot** indicates the heatsink temperature in approaching unsafe temperature levels.

Page 6: [68] Comment [ 76]                      Technical Support                      3/11/2008 9:30:00 AM

In order to gain an insight into the possible causes of recurring or occasional drive failures, we've created a questionnaire of common questions we find ourselves asking customers when we suspect input power problems.

Page 6: [69] Comment [ 77]                      Technical Support                      3/11/2008 9:30:00 AM

Slot error codes are different for the various application modules that are supported by the drive. This troubleshooting guide will assist in properly identifying what module you have and finding the corresponding trip code details relevant to that module.

Page 6: [70] Comment [ 78]                      Technical Support                      3/11/2008 9:30:00 AM

Slot error codes are different for the various application modules that are supported by the drive. This troubleshooting guide will assist in properly identifying what module you have and finding the corresponding trip code details relevant to that module.

Page 7: [71] Comment [ 79]                      Technical Support                      3/11/2008 9:27:00 AM

The **It.AC** trip indicates the output overload accumulator has timed out. This can be viewed at #4.19 and is in units of %. When it reaches 100% the drive will trip out. Parameter #4.19 is a percentage of calculated maximum motor temperature. The thermal time constant is set up at parameter #4.15 and is units of seconds. If #4.15 is increased it adjusts the thermal model of the motor so that the drive will run longer at high currents before the drive trips out. The point at which the accumulator at #4.19 starts to increase is when #4.01 (Current Magnitude) exceeds #5.07 (Motor rated current).

Page 7: [72] Comment [ 80]                      Technical Support                      4/30/2008 10:52:00 AM

There are several events that can cause a drive to **OU** trip. We must first determine when the drive is tripping. Is the drive tripping during deceleration, just after acceleration, constant motoring, or when the motor is idle?

Page 7: [73] Comment [ 81]                      Technical Support                      3/11/2008 9:28:00 AM

The drive will trip **OI.AC** ( Over Current. AC ) if the output current reaches 225% of rated full load current. The drives rated full load current is displayed at #0.32 in the SP and #0.33 in the Unidrive Classic.

Page 7: [74] Comment [ 82]                      Technical Support                      3/11/2008 4:26:00 PM

The Unidrive can be enabled to run in several ways. They can use digital inputs, keypad, or a field buss network to give the OK to run. The drive will display inh, rdy, or run depending on the command applied. The drive can be configured to use positive or negative logic.

Page 7: [75] Comment [ 83]                      Technical Support                      3/11/2008 9:40:00 AM

When there are multiple power modules involved a fault may need to be isolated. This document can also be used for instructions on how to move the Control Pod to another power module in an effort to isolate a fault condition.

Page 7: [76] Comment [ 84]                      Technical Support                      3/11/2008 4:29:00 PM

**Hardware Faults are typically fatal. If powering down and letting the drive sit for 5 minutes before re-application of Power does not clear the HF Fault it would require Drive repair.**

Page 7: [77] Comment [ 86]                      Technical Support                      3/11/2008 4:29:00 PM

The **Oh2** trip indicates the internal thermistor has detected a temperature in excess of 201°F (94°C) at the heatsink. It is common to see the word **hot** flashing on the display prior to the **Oh2** trip. The **hot** indicates the heatsink temperature has crossed the 194° F (90° C) threshold and is getting close to the maximum allowed temperature.

Page 7: [78] Comment [ 87]                      Technical Support                      3/11/2008 4:30:00 PM

In order to gain an insight into the possible causes of recurring or occasional drive failures, we've created a questionnaire of common questions we find ourselves asking customers when we suspect input power problems.

Page 7: [79] Comment [ 88]                      Technical Support                      3/11/2008 4:36:00 PM

When there are multiple power modules involved a fault may need to be isolated. This document can also be used for instructions on how to move the Control Pod to another power module in an effort to isolate a fault condition.

Page 7: [80] Comment [ 89]                      Technical Support                      3/11/2008 9:29:00 AM

**Problem:** Over temperature trips (Ot HS n) on UNI 5 power modules cannot be differentiated between a properly operating thermistor and a defective one.

**Solution:** By measuring the DC voltage or resistance across each thermistor, the technician can readily tell if there is a true over temperature condition and/or a defective thermistor.

Page 7: [81] Comment [ 90]

Technical Support

3/11/2008 9:40:00 AM

**AdOI** may be displayed without the IN96 board OVERTEMP LED lighting. A pull-up resistor associated with the overtemperature trip circuit that has too high a value may cause this anomaly. This results in the trip circuit outputting a voltage between “no trip” and “full trip” values resulting in AdOI being displayed.

Page 7: [82] Comment [ 91]

Technical Support

3/11/2008 9:32:00 AM

In order to gain an insight into the possible causes of recurring or occasional drive failures, we've created a questionnaire of common questions we find ourselves asking customers when we suspect input power problems.