

Chapter 10: Trips & Fault Finding

Trips and Fault Finding

WHAT HAPPENS WHEN A TRIP OCCURS

When a trip occurs, the drive's power stage is immediately disabled causing the motor and load to coast to a stop. The trip is latched until action is taken to reset it. This ensures that trips due to transient conditions are captured and the drive is disabled, even when the original cause of the trip is no longer present.


Keypad Indications

If a trip condition is detected the activated alarm is displayed on the GKP display.

RESETTING A TRIP CONDITION

All trips must be reset before the drive can be re-enabled. A trip can only be reset once the trip condition is no longer active, i.e. a trip due to a heatsink over-temperature will not reset until the temperature is below the trip level.

You can reset the trip as follows:

1. Press the  (STOP) key to reset the trip and clear the alarm from the display.
2. In remote terminal sequencing mode, create a 0 to 1 transition on the RESET TRIP bit, (bit 7), in the App Control Word parameter.
3. In remote communications sequencing mode, create a 0 to 1 transition on the RESET TRIP bit, (bit 7), in the Comms Control Word parameter.

USING THE KEYPAD TO MANAGE TRIPS

Trip Messages

If the drive trips, then the display immediately shows a message indicating the reason for the trip. The possible trip messages are given in the table below.

ID	Trip Name	Possible Reason for Trip	Criteria for Warning
1	OVER VOLTAGE	<p><i>The drive internal dc link voltage is too high:</i></p> <ul style="list-style-type: none"> The supply voltage is too high Trying to decelerate a large inertia load too quickly; DECEL TIME time too short The brake resistor is open circuit <p>To help prevent this trip, enable the DC Link Volts Limit feature</p>	<p><i>Internal dc link voltage has reached midway between the over voltage trip level and the dynamic braking resistor control voltage.</i></p>
2	UNDER VOLTAGE	<p><i>DC link low trip:</i></p> <ul style="list-style-type: none"> Supply is too low/power down 	<p><i>Internal dc link voltage has reached midway between the lowest expected instantaneous voltage and the under voltage trip level.</i></p>
3	OVER CURRENT	<p><i>The motor current being drawn from the drive is too high:</i></p> <ul style="list-style-type: none"> Trying to accelerate a large inertia load too quickly; ACCEL TIME time too short Trying to decelerate a large inertia load too quickly; DECEL TIME time too short Application of shock load to motor Short circuit between motor phases Short circuit between motor phase and earth Motor output cables too long or too many parallel motors connected to the drive FIXED BOOST level set too high 	<p><i>The over current trip makes up of a multiple-attempt strategy. The warning is triggered if two or more consecutive overcurrent events are encountered (whereas five consecutive events are required for a Trip to occur).</i></p>
4	STACK FAULT	<p><i>Stack self protection</i></p> <ul style="list-style-type: none"> Instantaneous overcurrent detected by the power stack. Refer to OVERCURRENT in this table. Instantaneous over voltage event. Refer to OVER VOLTAGE in this table 	<p><i>Not applicable.</i></p>
5	STACK OVER CURRENT	<p><i>The motor current exceeded the capabilities of the power stack.</i></p> <ul style="list-style-type: none"> Instantaneous overcurrent detected by the power stack. Refer to OVERCURRENT in this table. 	<p><i>Not applicable.</i></p>
6	CURRENT LIMIT	<p>V/Hz mode only: If the current exceeds 200% of stack rated current for a period of 1 second, the drive will trip. This is caused by shock loads</p>	<p><i>Not applicable.</i></p>

ID	Trip Name	Possible Reason for Trip	Criteria for Warning
7	MOTOR STALL	<i>The motor has stalled (not rotating) Drive in current limit >200 seconds:</i> <ul style="list-style-type: none"> Motor loading too great FIXED BOOST level set too high 	<i>The stall condition has been detected for more than one tenth of the configured Stall Time.</i>
8	INVERSE TIME	<i>A prolonged overload condition, exceeding the Inverse Time allowance, has caused the trip:</i> <ul style="list-style-type: none"> Remove the overload condition 	<i>An overload condition has exceeded one half of the Inverse Time allowance.</i>
9	MOTOR I2T	Only for PMAC Motor: A prolonged load condition, exceeding the motor rated current, has caused the trip. The estimated motor load has reached a value of 105%	<i>An overload condition has exceeded one half of the motor Inverse Time allowance.</i>
10	LOW SPEED I	<i>The motor is drawing too much current (>100%) at zero output frequency:</i> <ul style="list-style-type: none"> FIXED BOOST level set too high 	<i>Not applicable.</i>
11	HEATSINK OVERTEMP	<i>Drive heatsink temperature too high</i> <ul style="list-style-type: none"> The ambient air temperature is too high Poor ventilation or spacing between drives Check heatsink fan is rotating 	<i>The drive heatsink has exceeded the warning temperature level (which is approx. 10 °C below the trip temperature).</i>
12	INTERNAL OVERTEMP	<i>Processor temperature or ambient temperature within the power stage too high</i> <ul style="list-style-type: none"> The ambient temperature in the drive is too high 	<i>The drive processor temperature has exceeded the warning temperature level (which is approx. 10 °C below the trip temperature).</i>
13	MOTOR OVERTEMP	<i>The motor temperature is too high, (required IO Option card)</i> <ul style="list-style-type: none"> Excessive load Motor voltage rating incorrect FIXED BOOST level set too high Prolonged operation of the motor at low speed without forced cooling Break in motor thermistor connection 	<i>The motor has been over temperature for 7.5 seconds.</i>
14	EXTERNAL TRIP	<i>The external (application) trip input is high:</i> <ul style="list-style-type: none"> Refer to the application description to identify the source of the signal 	<i>Not applicable.</i>
15	BRAKE SHORT CCT	<i>External dynamic brake resistor has been overloaded:</i> <ul style="list-style-type: none"> The external dynamic brake has developed a short circuit. Wiring fault 	<i>Not applicable.</i>

ID	Trip Name	Possible Reason for Trip	Criteria for Warning
16	BRAKE RESISTOR	<p><i>External dynamic brake resistor has been overloaded:</i></p> <ul style="list-style-type: none"> Trying to decelerate a large inertia too quickly or too often 	<i>The power calculation for the external resistor has exceeded one half of the Brake Overtating allowance.</i>
17	BRAKE SWITCH	<p><i>Internal dynamic braking switch has been overloaded:</i></p> <ul style="list-style-type: none"> Trying to decelerate a large inertia too quickly or too often 	<i>The power calculation for the internal dynamic braking switch has exceeded one half of the its overrating allowance.</i>
18	LOCAL CONTROL	<p><i>Keypad has been disconnected from drive whilst drive is running in Local Control:</i></p> <ul style="list-style-type: none"> GKP accidentally disconnected from drive 	<i>Not applicable.</i>
19	COMMS BREAK	<p><i>Lost option communications:</i></p> <ul style="list-style-type: none"> A break in option communications has been detected. Refer to option communications manual. 	<i>Not applicable.</i>
20	LINE CONTACTOR	<p><i>DC Link failed to reach the undervoltage trip level within the contactor feedback time.</i></p> <ul style="list-style-type: none"> The Line contactor failed to connect. Missing 3-phase line supply 	<i>Not applicable.</i>
21	PHASE FAIL	<ul style="list-style-type: none"> Indicates a missing input phase, for Frame K drives. 	<i>Not applicable.</i>
22	VDC RIPPLE	<p><i>The DC link ripple voltage is too high:</i></p> <ul style="list-style-type: none"> Check for a missing input phase Repetitive start / stop or forward reverse action. 	<i>The dc link ripple has exceeded 75% of the trip level.</i>
23	BASE MODBUS BREAK	<p><i>Lost Base Modbus communications:</i></p> <ul style="list-style-type: none"> A break in the Base Modbus communications has been detected. Refer to "Appendix A Modbus TCP". 	<i>Not applicable.</i>
24	24V OVERLOAD	<p><i>24V rail is low</i></p> <ul style="list-style-type: none"> Output overload due to excess current being drawn from the 24v terminal. 	<i>Not applicable.</i>
25	PMAC SPEED ERROR	<p><i>Only for PMAC motor : When using the Start feature in Sensorless Vector Control, the real speed hasn't reached the speed setpoint after 5 seconds to move from open to closed loop control or to move from closed to open loop</i></p>	<i>Not applicable.</i>
26	OVERSPEED	<p><i>Overspeed:</i></p> <ul style="list-style-type: none"> >150% base speed when in Sensorless Vector mode 	<i>Not applicable.</i>

ID	Trip Name	Possible Reason for Trip	Criteria for Warning
27	STO ACTIVE	<p><i>Attempt to run the motor with the Safe Torque Off active</i></p> <ul style="list-style-type: none"> Check the STO wiring. It may be necessary to power the drive off and on to completely clear this event. 	<i>Not applicable.</i>
28	FEEDBACK MISSING	<p><i>The drive has been configured to run in Closed Loop Vector control mode with a Pulse Encoder IO Option, but the IO Option has not been correctly configured.</i></p> <p>The drive has been configured to run in Closed Loop Vector control mode with a System Board and/or a Pulse Encoder IO Option (using one of the 3 possible encoder inputs), but the system board or the IO option has not been declared as required.</p>	<i>Not applicable.</i>
29	INTERNAL FAN FAIL	<p><i>An internal cooling fan has failed. This will reduce the lifetime of the power electronics.</i></p> <ul style="list-style-type: none"> Return the power stack to a Parker Hannifin repair centre. 	<i>Not applicable.</i>
30	CURRENT SENSOR	<p><i>Current feedback phase missing</i></p> <ul style="list-style-type: none"> Check motor phase connections 	<i>Not applicable.</i>
31	POWER LOSS STOP	<i>A Power Loss Ride Through sequence has occurred and either 1650 Pwrl Time Limit has been exceeded or the motor speed has reached a zero speed during the sequence.</i>	<i>Not applicable.</i>
32	SPEED SENSOR FAULT	Not applicable.	Encoder has failed whilst operating in vector control of induction motor. The drive switches to sensorless operation automatically (if this feature is enabled), and provides a warning to the user.
33	A1	<i>Application trip 1. The application trips are controlled by the Application_Trips block in the configuration. The text associated with each trip can be re-defined by the Application_Trips_Text block in the configuration.</i>	<i>Application warning 1.</i>
34	A2	<i>Application trip 2</i>	<i>Application warning 2.</i>
35	A3	<i>Application trip 3</i>	<i>Application warning 3.</i>
36	A4	<i>Application trip 4</i>	<i>Application warning 4.</i>
37	A5	<i>Application trip 5</i>	<i>Application warning 5.</i>
38	A6	<i>Application trip 6</i>	<i>Application warning 6.</i>
39	A7	<i>Application trip 7</i>	<i>Application warning 7.</i>

ID	Trip Name	Possible Reason for Trip	Criteria for Warning
40	A8	Application trip 8	Application warning 8.
41	SPEED ERROR FAULT	Difference between actual motor speed and the speed setpoint is greater than a threshold for a period of time.	Difference between actual motor speed and the speed setpoint has been greater than the trip threshold for more than half the trip delay time.
42	PEER TO PEER OVERRUN	Configuration error on Master and/or Slave(s) side PTP or Peer to Peer are OFF on one drive Destination IP or Destination Port incompatible between Master and Slave(s) Peer to Peer is not useable	Multiple delayed Peer To Peer messages have occurred. This may cause incorrect phase alignment if phase control is being used.
43	PHASE CONFIG	Something is wrong in the phase configuration : one or more of the encoders set up for speed control, master and/or slave are wrongly declared. See Phase Ctrl Config : Error Number for a detailed description of the error (Only applicable if phase control is enabled)	Not applicable.
44	ETHERNET IP BREAK	Lost Base EtherNet IP communications: A break in the Base EtherNet IP communications has been detected. Refer to "Appendix A EtherNet IP Adapter".	Not applicable.
45	RESOLVER ERROR	An error has been detected on the resolver signals Error type is available by looking at 1820 Resolver Trip Type	Not applicable
46	PMAC ALIGN ERROR	If 1796 Alignment on Power On has been set to TRUE, the drive should run a successful Pos Alignment sequence, at power up before being run safely. or Something wrong occurred during the last Pos Alignment sequence. Error type is available by looking at 1807 Alignment error	Not applicable

HEXADECIMAL REPRESENTATION OF TRIPS

Each trip has a unique, eight-digit hexadecimal number as shown in the tables below. This number is referred to as the trip mask. The trip masks are used in the Enable, Active and Warnings parameters in the Trips module.

ID	Trip Name	Mask	User Disable
1	OVER VOLTAGE	00000001	
2	UNDER VOLTAGE	00000002	
3	OVER CURRENT	00000004	
4	STACK FAULT	00000008	
5	STACK OVER CURRENT	00000010	
6	CURRENT LIMIT	00000020	✓
7	MOTOR STALL	00000040	✓
8	INVERSE TIME	00000080	✓
9	MOTOR I2T	00000100	✓
10	LOW SPEED I	00000200	✓
11	HEATSINK OVERTEMP	00000400	
12	AMBIENT OVERTEMP	00000800	✓
13	MOTOR OVERTEMP	00001000	✓
14	EXTERNAL TRIP	00002000	✓
15	BRAKE SHORT CCT	00004000	✓
16	BRAKE RESISTOR	00008000	✓
17	BRAKE SWITCH	00010000	✓
18	LOCAL CONTROL	00020000	✓
19	COMMS BREAK	00040000	✓
20	LINE CONTACTOR	00080000	✓
21	PHASE FAIL	00100000	✓
22	VDC RIPPLE	00200000	✓
23	BASE MODBUS BREAK	00400000	✓

ID	Trip Name	Mask	User Disable
24	24V OVERLOAD	00800000	✓
25	PMAC SPEED ERROR	01000000	✓
26	OVERSPEED	02000000	✓
27	SAFE TORQUE OFF	04000000	
28	FEEDBACK MISSING	08000000	
31	POWER LOSS STOP	40000000	✓
32	SPEED SENSOR FAULT	80000000	✓
33	A1	00000001*	✓
34	A2	00000002*	✓
35	A3	00000004*	✓
36	A4	00000008*	✓
37	A5	00000010*	✓
38	A6	00000020*	✓
39	A7	00000040*	✓
40	A8	00000080*	✓
41	SPEED ERROR FAULT	00000100*	✓
42	PEER TO PEER OVERRUN	00000200*	✓
43	PHASE CONFIG	00000400*	✓
44	ETHERNET IP BREAK	00000800*	✓
45	RESOLVER ERROR	00001000*	
46	PMAC ALIGN ERROR	00002000*	

* These masks apply to parameter words "33 – 64"

Runtime Alerts

A Runtime Alert is a fault that indicates a permanent hardware error. The Runtime Alert display is of the form

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    RUNTIME ALERT
    CODE  00000000  xx
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CODE is a number in the range 0 to 65000. The following value is used to provide additional information to assist Parker Hannifin Technical Support personnel.

CODE	ERROR	Possible Reason for Error
1 to 255	Internal exception	<ul style="list-style-type: none"> • VCM not secured to power stack • Option not secured correctly to VCM control card • Earth bonding failure. • Fault during firmware upgrade
12	Memory access	<ul style="list-style-type: none"> • Attempt to read or write to protected memory. Most likely this will be due to a configuration error. Press OK several times until the drive resets correctly, then replace the configuration using PDQ. • Record the error message and contact Technical Support
1001 to 1003	Processor overload	<ul style="list-style-type: none"> • Select a lower switching frequency, (Parameters::Motor Control::Pattern Generator::Stack Frequency) • Record the error message and contact Technical Support
1006	Memory overflow	<ul style="list-style-type: none"> • Reduce the complexity of the application • Reduce the number of parameters being accessed via the on board Modbus TCP protocol • Reduce the number of parameters being accessed by the fieldbus communications option.
1007	Uninitialized pointer	<ul style="list-style-type: none"> • Record the error message and contact Technical Support
1010, 1101 to 1113	Initialization error	<ul style="list-style-type: none"> • Record the error message and contact Technical Support
1200 to 1299	Communications option error	<ul style="list-style-type: none"> • Ensure the communications option is correctly fitted • Update the firmware in the inverter. • Replace the communications option

CODE	ERROR	Possible Reason for Error
1300	Ethernet fault	<ul style="list-style-type: none"> Record the error message and contact Technical Support
1301	Modbus server	<ul style="list-style-type: none"> Record the error message and contact Technical Support
1302	HTTP server fault	<ul style="list-style-type: none"> Record the error message and contact Technical Support
1303	DCT server fault	<ul style="list-style-type: none"> Record the error message and contact Technical Support
1311	Ethernet PHY	<ul style="list-style-type: none"> Record the error message and contact Technical Support
1312	Precision Time Protocol	<ul style="list-style-type: none"> Record the error message and contact Technical Support
1313	EtherNet IP	<ul style="list-style-type: none"> Record the error message and contact Technical Support
1401 1402	Control Module test	<ul style="list-style-type: none"> Control module self-test error
1403 1404	Power stack test	<ul style="list-style-type: none"> VCM not secured to power stack Power stack self-test error
1501 1502 1503	IO Option identity IO Option processor Unknown IO Option	<ul style="list-style-type: none"> Ensure the IO option is correctly fitted Update the firmware in the inverter. Replace the IO option
1504	IO Option watchdog	<ul style="list-style-type: none"> The IO Option has become disconnected Option reset problem. Upgrade drive firmware to 1.11 or greater to improve the option reset control.
1601	Stack internal fault	<ul style="list-style-type: none"> Return the power stack to Parker Hannifin repair center.
1602	Incompatible stack	<ul style="list-style-type: none"> Return the power stack to Parker Hannifin repair center.
1801	Heatsink thermistor unplugged	<ul style="list-style-type: none"> Return the power stack to Parker Hannifin repair center.
1901	System Board Data	<ul style="list-style-type: none"> The identifying data on the system board is corrupt
1902	System Board Type	<ul style="list-style-type: none"> The system board type is not recognized by this version of drive firmware. Update the firmware to the latest version.
2002	Memory allocation error	<ul style="list-style-type: none"> Record the error message and contact Technical Support

Autotune Alerts

If the autotune fails to complete for any reason, an alert will be displayed and the autotune abandoned. Alerts are as follows:

Alert message	Possible Cause	Remedy
LEAKAGE L TIMEOUT	The autotune has attempted to determine the leakage inductance of the motor, but cannot make the required test current.	Problem with motor connection.
MOTOR TURNING ERROR	The autotune is trying to find the encoder direction by spinning the motor, but the motor is already spinning.	Wait till the motor stops.
NEGATIVE SLIP FREQ	Autotune has calculated a negative slip frequency, which is not valid. Nameplate rpm may have been set to a value higher than the base speed of the motor.	Check nameplate rpm, base frequency, and pole pairs are correct.
TR TOO LARGE	The calculated value of rotor time constant is too large.	Check the values of Nameplate Speed and Base Frequency.
TR TOO SMALL	The calculated value of rotor time constant is too small.	Check the values of Nameplate Speed and Base Frequency.
MAX SPEED TOO LOW	During Autotune the motor is required to run at the nameplate speed of the motor. If 100% Speed in RPM parameter limits the speed to less than this value, an error will be reported.	Increase the value of 100% Speed in RPM parameter up to the nameplate rpm of the motor (as a minimum). It may be reduced, if required, after the Autotune is complete.
SUPPLY VOLTS LOW	The autotune will compensate for low supply volts, down to 70% of motor rated volts. Below this value it will stop the autotune and raise an alert.	Re-try when mains volts are within specification.
NOT AT SPEED	The motor was unable to reach the required speed to carry out the Autotune.	Possible reasons include: motor shaft not free to turn; the motor data is incorrect.

Alert message	Possible Cause	Remedy
MAG CURRENT ERROR	It was not possible to find a suitable value of magnetising current to achieve the required operating condition for the motor.	Check the motor data is correct, especially nameplate rpm and motor volts. Also check that the motor is correctly rated for the drive.
KE TOO LARGE	Ke value calculated during the autotune (stationary) is too large (the max value is 840V)	Check the motor data is correct, especially nameplate rpm, rated amps and motor volts. If low speed motor with a Ke value higher than 840V, enter by hand the corresponding value after the autotune completion.
KE TOO SMALL	Ke value calculated during the autotune (stationary) is too small (the min value is 1V)	Check the motor data is correct, especially nameplate rpm, rated amps and motor volts.
ALL TESTS DISABLED	All auto tune tests are disabled	Check parameter 0257: Autotune Test Disable

Other Alerts

Alert message	Possible Cause	Remedy
** ALERT ** DEFAULTS LOADED	First power up with new control module	Initialise all parameters using the GKP setup wizard or PDQ
** ALERT ** APPLICATION MISSING	Fault during application download. Application deleted by the drive	Re-install the application from PDQ or PDD Custom applications only: check the application for any delays or loops that may cause the application task to "hang".
** ALERT ** POWER STACK MISMATCH	Parameter 0987 "Power Stack Required" does not equal the ID of the stack.	Change "Power Stack Required" to match "Power Stack Fitted". After doing this it may be necessary to restore parameters to default and reconfigure the drive. This is to ensure that all parameters have appropriate values.
** ALERT ** APPLICATION DELETED	Application deleted by the drive	Custom applications only: check the application for any delays or loops that may cause the application task to "hang".
** ALERT ** FIRE MODE	Fire Mode has been activated	If this message is not expected, use PDD to check if the Fire Mode block is in the configuration.
COAST TO STOP	Attempting to start the drive in local mode with Coast To Stop active.	The Coast To Stop input is active low. This input needs to be driven high. The input may be ignored in the standard application by setting "Disable Coast Stop".
ENABLE VOLTAGE	Attempting to start the drive in local mode with the Enable input is inactive	The Enable input needs to be driven high. This is done in the default application.
QUICKSTOP ACTIVE	Attempting to start the drive in local mode with Quick Stop active.	The Quick Stop input is active low. This input needs to be driven high. The input may be ignored in the standard application by setting "Disable Quick Stop".
OPERATION ENABLED	Attempting to change from Local control to Remote control with the Run signal true	To change to Remote control, (terminals), ensure that the Run input is false.
MAX SPD GT ATN SPD	Parameter 0464 "100% Speed in RPM" has been increased since auto-tune.	Check the value of "100% Speed in RPM". It may be necessary to repeat the auto tune with the higher value of max speed.

Alert message	Possible Cause	Remedy
** ALERT ** UNKNOWN STACK	The stack is understood by the firmware	Upgraded the drive firmware.
** ALERT ** APPLICATION LOAD FAILED	Fault during application download. Application deleted by the drive	Re-install the application from PDQ or PDD Custom applications only: check the application for any delays or loops that may cause the application task to "hang".
COMMS OPTION HARDWARE MISMATCH	Parameter 0044 "Comms Required" is not compatible with the fitted communications option	Fit the correct communications option. Change the application to be compatible with the fitted option, (setting "Comms Required" to NONE will avoid this alert).
COMMS OPTION CONFIGURATION ERROR	The configuration settings are not compatible with the selected option	Refer to the communications option manual, "Troubleshooting".
IO OPTION HARDWARE MISMATCH	Parameter 1178 "Option IO Required" is not compatible with the fitted IO option	Fit the correct IO option. Change the application to be compatible with the fitted option, (setting "Option IO Required" to NONE will avoid this alert).
** ALERT ** FEEDBACK MISSING	Attempt to run in Encoder Feedback control mode with no feedback device fitted, (or configured).	Change the control mode to VHz or Sensorless Fit the correct feedback option Check parameter 1178 "Option IO Required"
** ALERT ** IO OPTION CHANGED	The IO Option has been changed.	IO Option removed, IO Option attached or different IO Option fitted. This alert is for information only and occurs just once following the change.
** ALERT ** COMMS OPTION CHANGED	The Communications Option has been changed.	Comms Option removed, Comms Option attached or different Comms Option fitted. This alert is for information only and occurs just once following the change.
** ALERT ** UPDATING LANGUAGE	Updating the translations held in the GKP. This may happen the first time a language is selected.	No action required. The language update should complete within one minute.
PCR NOT CLOSED	The pre-charge relay is not closed, (probably due to low DC Link volts)	Check the 3-phase input or common supply.
SYSTEM BOARD HARDWARE MISMATCH	Parameter 1739 "System Board Required" not correctly set.	This indicates that the drive has never been commissioned. It is advised to reset all parameters to their default values.

Alert message	Possible Cause	Remedy
** ALERT ** SYSTEM BOARD CHANGED	Unreliable connection to the system board	Power off / on then verify that the system board is functioning correctly. If this message occurs more than once contact the service department for assistance.

Fault Finding

Problem	Possible Cause	Remedy
Drive will not power-up	Fuse blown	Check supply details, fit correct fuse. Check Product Code against Model No.
	Faulty cabling	Check all connections are correct/secure. Check cable continuity
Drive fuse keeps blowing	Faulty cabling or connections wrong	Check for problem and rectify before replacing with correct fuse
	Faulty drive	Contact Parker
Cannot obtain power-on state	Incorrect or no supply available	Check supply details
Motor will not run at switch-on	Motor jammed	Stop the drive and clear the jam Safe Torque Off circuit active. Check the STO connections then power the drive off and on to clear any latched STO fault.
Motor runs and stops	Motor becomes jammed	Stop the drive and clear the jam
	Open circuit speed reference potentiometer	Check terminal

Black Box Feature

The Black Box feature can be used to help find the source of a trip. Data is saved automatically whenever a trip occurs that causes the drive to stop running. The data records the moments leading up to the trip and the state of the drive when the trip occurs. This may then be transferred to an SD card for off line analysis.

BLACK BOX FILE FORMAT

When copied to an SD card, the black box feature creates one file for each trip event, or record. The files are called "blackbox_xxxx.csv" where xxxx is replaced with a decimal number that is incremented automatically by the drive every time a trip occurs.

The data recorded in the lead up to the trip is:























- Up to four user defined parameters
- Output Current in phases U and V expressed as a percent of motor rating
- The rotor electrical frequency in Hz.
- The demanded electrical frequency in Hz
- The DC Link volts, (parameter **0392 DC Link Voltage**)
- The temperature of the control card PCB in centigrade, (parameter **0406 CM Temperature**)
- The temperature of the heatsink in centigrade, (parameter **0407 Heatsink Temperature**)
- The sequencing control word, (parameter **0644 Control Word**)
- The sequencing status word, (parameter **0641 Status Word**)
- The input and output digital signals on the stack, words 1 and 2.
- The control card digital output and input latches.
- Various digital inputs to the micro-controller.
- Trip latch state
- Motor sequencer state
- Motor sequencer start and stop states.
- Main sequencer state, (parameter **0678 Sequencing State**)
- High current limit activity
- Stall trip torque limit state
- Stall trip current limit state

The data recorded at the instant of the trip is output at the end of the file. This consists of:

- Control module serial number, (parameter **0977 Control Module Serial**)
- Time of the trip. This is either the control board age, or the time from the optional Real Time Clock if fitted.
- State of all other trips, active or warning.
- Count of total motor starts, (parameter **1732 Motor Start Count**)
- Count of total times the 3-phase has been powered
- For each trip, a count of the total times that trip has been activated.
- A record of near trip events for Over Current, Over Voltage and Under Voltage.
- The product code of the drive, expressed as a number in internal format.
- The IO Option fitted, (parameter **1179 Option IO Fitted**)
- The Communications Option fitted, (parameter **0045 Comms Fitted**)
- The System board type, (parameter **1740 System Board Fitted**)
- The motor control type, (parameter **0511 Motor Type or AFE**)
- The control strategy, (parameter **0512 Control Stragegy**)
- The control type, (parameter **1533 Control Type**)
- The firmware version
- The version of CoDeSys used to create the application.

Diagnostic LEDs

There are two diagnostic LEDs fitted next to the SD Card slot. The Health LED is on the left, closest to the connector for the GKP. The flash period is 1s when the drive firmware is active and 2s in the Firmware Update mode

HEALTH LED	RUN LED	
		STOPPED
		RUNNING
		STOPPING, (NORMAL)
		QUICKSTOPPING
		FAULTED
		INITIALISING
		CONFIGURATION MODE
		CONFIGURATION FAULT
		FIRMWARE UPDATE – Idle
		FIRMWARE UPDATE - Erasing firmware
		FIRMWARE UPDATE – Writing firmware