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# Technologic<sup>®</sup> IPC

WARNINGS AND ALARMS DOCUMENT

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**Bell & Gossett**

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# Warnings and Alarms

Warning/Alarm	Description	Cause	Remedy
1 – 10 V low	The control card voltage is below 10 V from terminal 50.	A short in a connected potentiometer or improper wiring of the potentiometer.	Remove the wiring from terminal 50. If the warning clears, the problem is with the customer wiring.
2 – Sensor Fault	This warning or alarm will only appear if programmed by the user in 6-01 Sensor Fault Timeout Function. The signal on one of the analog inputs is less than 50% of the minimum value that is programmed for that input.	Broken wiring or faulty device sending the signal.	Check the connections on all the analog input terminals. Control card terminals 53 and 54 for signals, terminal 55 common. General Purpose I/O Option Card terminals 11 and 12 for signals, terminal 10 common. Analog I/O Option Card terminals 1, 3, 5 for signals, terminals 2, 4, 6 common.  Check that the frequency converter programming and switch settings match the analog signal type.  Perform Input Terminal Signal Test
4 – Input phase loss	A phase is missing on the supply side, or the mains voltage imbalance is too high. This message also appears for a fault in the input rectifier on the frequency converter. Options are programmed at [14-12] Function at Input Imbalance (not applicable for single-phase drives).		Check the supply voltage and supply currents to the frequency converter.
5 – DC link voltage high	The intermediate circuit voltage (DC) is higher than the high voltage warning limit.	The limit is dependent on the frequency converter voltage rating. The frequency converter is still active.	
6 – DC link voltage low	The intermediate circuit voltage (DC) is lower than the low voltage warning limit.	The limit is dependent on the frequency converter voltage rating. The frequency converter is still active.	
7 – DC overvoltage	If the intermediate circuit voltage exceeds the limit, the frequency converter trips after a time.		Connect a brake resistor Extend a ramp time Change the ramp type Activate functions in [2-10] Brake Function Increase [14-26] Trip Delay at Inverter Fault
8 – DC under voltage	If the intermediate circuit voltage (DC) drops below the under voltage limit, the frequency converter checks if a 24 VDC backup supply is connected.	If no 24 VDC backup supply is connected, the frequency converter trips after a fixed time delay. The time delay varies with unit size.	Check that the supply voltage matches the frequency converter voltage.  Perform input voltage test  Perform soft charge and rectifier circuit test.

Warning/Alarm	Description	Cause	Remedy
9 – Inverter overloaded	The frequency converter is about to cut-out because of an overload (too high current for too long). The counter for electronic, thermal inverter protection gives a warning at 98% and trips at 100% while giving an alarm. The frequency converter cannot be reset until the counter is below 90%.	The fault is that the frequency converter is overloaded by more than 100% for too long.	Compare the output current shown on the LCP with the frequency converter rated current. Compare the output current shown on the LCP with the measured motor current. Display the Thermal Drive Load on the LCP and
10 – Motor overload temperature	According to the electronic thermal protection (ETR), the motor is too hot. Select whether the frequency converter gives a warning or an alarm when the counter reaches 100% in 1-90 Motor Thermal Protection.	The fault occurs when the motor is overloaded by more than 100% for too long.	Check for motor overheating. Check if the motor is mechanically overloaded. Check that the motor current set in [1-24] Motor Current is correct.
11 – Motor thermistor over temp	The thermistor might be disconnected. Select whether the frequency converter gives a warning or an alarm in 1-90 Motor Thermal Protection.		Check for motor overheating. Check if the motor is mechanically overloaded.  When using terminal 54, check that the thermistor is connected correctly between terminal 54 (analog voltage input) and terminal 50 (+10V supply) and that the terminal switch for 54 is set for voltage. Check [1-93] Thermistor Source selects terminal 54.  When using digital inputs 18 or 19, check that the thermistor is connected correctly between either terminal 18 or 19 (digital input PNP only) and terminal 50. Check [1-93] Thermistor Source selects terminal 18 or 19.
12 – Torque limit	The torque has exceeded the value in 4-16 Torque Limit Motor Mode or the value in 4-17 Torque Limit Generator Mode. 14-25 Trip Delay at Torque Limit can change this from a warning only condition to a warning followed by an alarm.		If the motor torque limit is exceeded during ramp up, extend the ramp up time.  If the generator torque limit is exceeded during ramp down, extend the ramp down time.  If torque limit occurs while running, possibly increase the torque limit. Be sure the system can operate safely at a higher torque.  Check the application for excessive current draw on the motor.

Warning/Alarm	Description	Cause	Remedy
13 – Over current	The inverter peak current limit (approx. 200% of the rated current) is exceeded. The warning lasts about 1.5 seconds, then the frequency converter trips and issues an alarm. This fault may be caused by shock loading or fast acceleration with high inertia loads. If extended mechanical brake control is selected, trip can be reset externally.		Remove power and check if the motor can be turned. Check that the motor size matches the frequency converter. Check parameters 1–20 through 1–25 for correct motor data.
14 – Ground/Earth fault	There is current from the output phases to ground, either in the cable between the frequency converter and the motor or in the motor itself.		Remove power to the frequency converter and repair the earth fault. Check for ground faults in the motor by measuring the resistance to ground of the motor leads and the motor megohmmeter.
15 – Hardware mismatch	A fitted option is not operational with the present control board hardware or software.		Record the value of the following parameters and contact your Xylem supplier: <ul style="list-style-type: none"> <li>• [15–40] FC Type</li> <li>• [15–41] Power Section</li> <li>• [15–42] Voltage</li> <li>• [15–43] Software Version</li> <li>• [15–45] Actual Typecode String</li> <li>• [15–49] SW ID Control Card</li> <li>• [15–50] SW ID Power Cord</li> <li>• [15–60] Option Mounted</li> <li>• [15–61] Option SW Version</li> </ul>
16 – Short circuit	There is a short circuit in the motor or motor wiring.		Remove power to the frequency converter and repair the short circuit.
17 – Control word timeout	There is no communication to the frequency converter. The warning will only be active when [8–04] Control Timeout Function is NOT set to [0] OFF.	If [8–04] Control Timeout Function is set to Stop and Trip, a warning appears and the frequency converter ramps down until it stops then displays an alarm.	Check connections on the series communication cable. Increase [8–03] Control Timeout Time Check operation of the communication equipment Verify proper installation based on EMC requirements.
18 – Start failed	The speed has not been able to exceed [1–77] Compressor Start Max Speed [RPM] during start within the allowed time. (set in [1–79] Compressor Start Max Time to Trip).	This may be caused by a blocked motor.	
23 – Internal fan fault	The fan warning function checks if the fan is running. The fan warning can be disabled on [14–53] Fan Monitor.		Check for proper fan operation. Cycle power to the frequency converter and check that the fan operates briefly at startup. Check the sensors on the heatsink and control card.

Warning/Alarm	Description	Cause	Remedy
24 – External fan fault	The fan warning function checks if the fan is running. The fan warning can be disabled on [14– 53] Fan Monitor.		Check for proper fan operation. Cycle power to the frequency converter and check that the fan operates briefly at startup. Check the sensors on the heatsink and control card.
25 – Brake resistor short circuit	The brake resistor is monitored during operation. If a short circuit occurs, the brake function is disabled and the warning appears. The frequency converter is still operational but without the brake function.		Remove power to the frequency converter and replace the brake resistor (see [2–15] Brake Check).
26 – Brake resistor power limit	The power transmitted to the brake resistor is calculated as a mean value over the last 120 seconds of run time. The calculation is based on the intermediate circuit voltage and the brake resistance value set in [2–16] brake Max. Current.	The warning is active when the dissipated braking is higher than 90% of the brake resistance power.  If Trip [2] is selected in [2–13] Brake Power Monitoring, the frequency converter will trip when the dissipated braking power reaches 100%.	
27 – Brake chopper fault	The brake transistor is monitored during operation and if a short circuit occurs, the brake function is disabled and a warning is issued.	The frequency converter is still operational but, since the brake transistor has short-circuited, substantial power is transmitted to the brake resistor, even if it is inactive.	Remove power to the frequency converter and remove the brake resistor.
28 – Brake check failed	The brake resistor is not connected or not working.		Check [2–15] Brake Check.
29 – Heatsink temp	The maximum temperature of the heatsink has been exceeded. The temperature fault will not reset until the temperature falls below the reset heatsink temperature. The trip and reset points are based on the frequency converter power size.		Check for the following conditions: <ul style="list-style-type: none"> <li>• Ambient temperature too high.</li> <li>• Motor cable too long.</li> <li>• Incorrect airflow clearance above and below the frequency converter.</li> <li>• Blocked airflow around the frequency converter.</li> <li>• Damaged heatsink fan.</li> <li>• Dirty heatsink.</li> </ul>
30 – Motor phase U missing	Motor phase U between the frequency converter and the motor is missing.		Remove power from the frequency converter and check motor phase U.
31 – Motor phase V missing	Motor phase V between the frequency converter and the motor is missing.		Remove power from the frequency converter and check motor phase V.
32 – Motor phase W missing	Motor phase W between the frequency converter and the motor is missing.		Remove power from the frequency converter and check motor phase W.
33 – Inrush fault	Too many power-ups have occurred within a short time period.		Let the unit cool to operating temperature.
34 – Fieldbus communication fault	Communication between the fieldbus and the communication option card is not operating.		

Warning/Alarm	Description	Cause	Remedy
36 – Mains failure	This warning/alarm is only active if the supply voltage to the frequency converter is lost and 14– 10 Mains Failure is NOT set to [0] No Function.		Check the fuses to the frequency converter and mains power supply to the unit.
38 – Internal fault	When an internal fault occurs, a code number defined in the table below is displayed.		Cycle power to the frequency converter. Check that the option is properly installed. Check for loose or missing wiring. It may be necessary to contact your Xylem supplier or service department. Note the code number for further troubleshooting directions.
39 – Heatsink sensor	No feedback from the heatsink temperature sensor.	The signal from the IGBT Thermal sensor is not available on the power card. The problem could be on the power card, on the gate drive card, or the ribbon cable between the power card and gate drive card.	
40 – Overload of digital output terminal 27			Check the load connected to terminal 27 or remove short-circuit connection. Check [5-00] Digital I/O Mode and 5-01 Terminal 27 Mode.
41 – Overload of digital output terminal 29			Check the load connected to terminal 29 or remove short-circuit connection. Check [5-00] Digital I/O Mode and [5-02] Terminal 29 Mode.
42 – Overload of digital output on X30/6 or overload of digital output on X30/7			For X30/6, check the load connected to X30/6 or remove short-circuit connection. Check 5- 32 Term X30/6 Digi Out (General Purpose I/O Option Card). For X30/7, check the load connected to X30/7 or remove short-circuit connection. Check 5- 33 Term X30/7 Digi Out (General Purpose I/O Option Card).
45 – Ground fault 2	Ground (earth) fault on startup.		Check for proper grounding (earthing) and loose connections. Check for proper wire size. Check motor cables for shortcircuits or leakage currents.

Warning/Alarm	Description	Cause	Remedy
46 – Power card supply	The supply on the power card is out of range.	There are three power supplies generated by the switch mode power supply (SMPS) on the power card: 24 V, 5 V, +/- 18 V. When powered with 24 VDC with the 24VDC Backup Option Card option, only the 24 V and 5 V supplies are monitored. When powered with three-phase mains voltage, all three supplied are monitored.	Check for a defective power cord. Check for a defective control card. Check for a defective option card. If a 24 VDC power supply is used, verify proper supply power.
47 – 24 V supply low	The 24 V DC is measured on the control card.	The external 24 V DC backup power supply may be overloaded.	Contact your Xylem supplier.
48 – 1.8 V supply low	The power supply is measured on the control card.	The 1.8 V DC supply used on the control card is outside of allowable limits.	Check for a defective control card. If an option card is present, check for an overvoltage condition.
49 – Speed limit	When the speed is not within the specified range in [4-11] Motor Speed Low Limit [RPM] and [4-13] Motor Speed High Limit [RPM], the frequency converter will show a warning.	When the speed is below the specified limit in [1-86] Trip Speed Low [RPM] (except when starting or stopping) the frequency converter will trip.	
50 – AMA calibration failed			Contact your Xylem supplier or Xylem Service Department.
51 – AMA check Unom and Inom	The settings for motor voltage, motor current, and motor power are wrong.		Check the settings in parameters 1-20 to 1-25.
52 – AMA low Inom	The motor current is too low.		Check the setting in [4-18] Current Limit.
53 – AMA motor too big	The motor is too big for the AMA to operate.		
54 – AMA motor too small	The motor is too small for the AMA to operate.		
55 – AMA Parameter out of range	The parameter values of the motor are outside of the acceptable range. AMA will not run.		
56 – AMA interrupted by the user	The AMA has been interrupted by the user.		
57 – AMA timeout			Try to restart AMA again. Repeated restarts may overheat the motor.
58 – AMA internal fault			Contact your Xylem supplier.
59 – Current limit	The current is higher than the value in [4-18] Current Limit.		Ensure that motor data in parameters 1-20 through 1-25 are set correctly. Possibly increase the current limit. Be sure that the system can operate safely at a higher limit.
60 – Pump Protect	A digital input signal is indicating a pump protection external to the controller is active.		

## Technologic Intelligent Pump Controller

Warning/Alarm	Description	Cause	Remedy
62 – Output frequency at maximum limit	The output frequency has reached the value set in [4-19] Max Output Frequency.		Check the application to determine the cause. Possibly increase the output frequency. Be sure the system can operate safely at a higher output frequency. The warning will clear when the output drops below the maximum limit.
65 – Control card over temperature	The cut-out temperature of the control card is 80°C.		Check that the ambient operating temperature is within limits. Check for clogged filters. Check fan operation. Check the control card.
66 – Heatsink temperature low	The frequency converter is too cold to operate. This warning is based on the temperature sensor in the IGBT module.		Increase the ambient temperature of the unit.  A trickle amount of current can be supplied to the frequency controller whenever the motor is stopped by setting [2-00] DC Hold/Preheat Current at 5% and [1-80] Function at Stop.
67 – Option module configuration has changed	One or more options have either been added or removed since the last power down.		Check that the configuration change is intentional and reset the frequency controller.
68 – Safe stop activated	Loss of the 24 VDC signal on terminal 37 has caused the frequency controller to trip.		To resume normal operation, apply 24 VDC to terminal 37 and reset the frequency controller.
69 – Power card temperature	The temperature sensor on the power card is either too hot or too cold.		Check that the ambient operating temperature is within limits. Check for clogged filters. Check fan operation. Check the power card.
70 – Illegal FC configuration	The control card and power card are incompatible.		Contact your supplier with the typecode of the unit from the
80 – Drive initialized to default value	Parameter settings are initialized to default settings after a manual reset.		Reset the unit to clear the alarm.
92 – No flow	A no-flow condition has been detected in the system.	[22-23] No-Flow Function is set for alarm.	Troubleshoot the system and reset the frequency converter after the fault has been cleared.
93 – No Water/Loss of Prime	A low power condition in the system with the frequency converter operating at high speed may indicate the pump is out of water or has lost prime.	[22-26] No Water/Loss of Prime Function is set for alarm. The [22-39] No Water/Loss of Prime Limit is set too high.	Troubleshoot the system and reset the frequency converter after the fault has been cleared.
94 – Under Pressure	The system pressure is below the Under Pressure limit (Under Pressure Limit = Setpoint [22-25] Under Pressure Difference).	This may indicate leakage in the system. [22-50] Under Pressure Function is set for alarm.	Troubleshoot the system, and reset the frequency converter after the fault has been cleared.
95 – Broken belt	Torque is below the torque level set for no load, indicating a broken belt.	[22-60] Broken Belt Function is set for alarm.	Troubleshoot the system and reset the frequency converter after the fault has been cleared.



Warning/Alarm	Description	Cause	Remedy
96 – Start delayed	Motor start has been delayed due to short-cycle protection.	[22-76] Interval between Starts is enabled.	Troubleshoot the system and reset the frequency converter after the fault has been cleared.
97 – Stop delayed	Stopping the motor has been delayed due to short cycle protection.	[22-76] Interval between Starts is enabled.	Troubleshoot the system and reset the frequency converter after the fault has been cleared.
98 – Clock fault	Time is not set or the RTC clock has failed.		Reset the clock in [0-70] Date and Time.
200 – Fire mode		This indicates the frequency controller is operating in fire mode.	Cycle power to the unit to remove the warning. See the fire mode data in the alarm log on the controller.
201 – Fire mode was active	This indicates the frequency controller had entered fire mode.		Cycle power to the unit to remove the warning. See the fire mode data in the alarm log on the controller.
202 – Fire mode limits exceeded	While operating in fire mode one or more alarm conditions has been ignored which would normally trip the unit.	Operating in this condition voids unit warranty.	Cycle power to the unit to remove the warning. See the fire mode data in the alarm log on the controller.
203 – Missing motor	With a frequency converter operating multi-motors, an underload condition was detected.	This could indicate a missing motor.	Inspect the system for proper operation.
204 – Locked rotor	With a frequency converter operating multi-motors, an overload condition was detected.	This could indicate a locked rotor.	Inspect the motor for proper operation.
250 – New spare part	A component in the frequency converter has been replaced.		Reset the frequency converter for normal operation.
251 – New typecode	A component in the frequency converter has been replaced and the typecode changed.		Reset the frequency converter for normal operation.

# Troubleshooting

## Start up and operation troubleshooting

Symptom	Possible cause	Test	Solution
Display dark/No function	Missing or open fuses or circuit breaker tripped	See Pre-startup inspections table in this manual.	Check the input power source
	No power to the LCP	Check the LCP cable for proper connection or damage	Replace the faulty LCP or connection cable
	Shortcut on control voltage (terminal 12 or 50) or at control terminals	Check the 24 V control voltage supply for terminals 12/13 to 20-39 or 10 V supply for terminals 50 to 55	Wire the terminals properly
	Wrong LCP		Use only LCP #9K651.
	Wrong contrast setting		Press [status] + [▲]/[▼] to adjust the contrast
	Display (LCP) is defective	Test using a different LCP	Replace the faulty LCP or connection cable
	Internal voltage supply fault or SMPS is defective		Contact supplier
Intermittent display	Overloaded power supply (SMPS) due to improper control wiring or fault within the frequency converter	To rule out a problem in the control wiring, disconnect all control wiring by removing the terminal blocks.	If the display stays lit, then the problem is in the control wiring. Check the wiring for shorts or incorrect connections. If the display continues to cut out, follow the procedure for display dark.
Motor not running	Service switch open or missing motor connection	Check if the motor is connected and the connection is not interrupted (by a service switch or other device)	Connect the motor and check the service switch
	No mains power with 24 V DC option card	If the display is functioning but no output, check that mains power is applied to the frequency converter	Apply mains power to run the unit
	LCP Stop	Check if [Off] has been pressed	Press [Auto On] or [Hand On] (depending on operation mode) to run the motor
	Missing start signal (Standby)	Check 5-10 <i>Terminal 18 Digital Input</i> for correct setting for terminal 18 (use default setting)	Apply a valid start signal to start the motor
	Motor coast signal active (Coasting)	Check 5-12 <i>Coast inv.</i> for correct setting for terminal 27 (use default setting)	Apply 24 V on terminal 27 or program this terminal to No operation
	Wrong reference signal source	Check reference signals: Local, remote or bus reference? Preset reference active? Terminal connection correct? Scaling of terminals correct? Reference signal available?	Program correct settings. Check 3-13 <i>Reference Site</i> . Set preset reference active in parameter group 3-1* <i>References</i> . Check for correct wiring. Check scaling or terminals. Check reference signal.

Symptom	Possible cause	Test	Solution
Motor running in wrong direction	Motor rotation limit	Check that 4-10 <i>Motor Speed Direction</i> is programmed correctly.	Program correct settings
	Active reverse signal	Check if a reversing command is programmed for the terminal in parameter group 5-1* <i>Digital inputs</i> .	Deactivate reversing signal
	Wrong motor phase connection		
Motor is not reaching maximum speed	Frequency limits set wrong	Check output limits in 4-13 <i>Motor Speed High Limit [RPM]</i> , 4-14 <i>Motor Speed High Limit [Hz]</i> and 4-19 <i>Max Output Frequency</i> .	Program correct limits
	Reference input signal not scaled correctly	Check references input signal scaling in 6-0* <i>Analog I/O Mode</i> and parameter group 3-1* <i>References</i> . Reference limits in parameter group 3-0* <i>Reference Limit</i> .	Program correct settings
Motor speed unstable	Possible incorrect parameter settings	Check the settings of all motor parameters, including all motor compensation settings. For closed loop operation, check PID settings.	Check settings in parameter group 1-6* <i>Analog I/O mode</i> . For closed loop operation, check settings in parameter group 20-0* <i>Feedback</i> .
Motor runs rough	Possible over-magnetization	Check for incorrect motor settings in all parameters	Check motor settings in parameter groups 1-2* <i>Motor Data</i> , 1-3* <i>Adv Motor Data</i> , and 1-5* <i>Load Indep. Setting</i> .
Motor will not brake	Possible incorrect settings in the brake parameters. Possible too short ramp down times	Check brake parameters. Check ramp time settings	Check parameter group 2-0* <i>DC Brake</i> and 3-0* <i>Reference Limits</i> .
Open power fuses or circuit breaker trip	Phase to phase short	Motor or panel has a short phase to phase. Check motor and panel phase for shorts	Eliminate any shorts detected
	Motor overload	Motor is overloaded for the application	Perform startup test and verify motor current is within specifications. If motor current is exceeding nameplate full load current, motor may run only with reduced load. Review the specifications for the application.
	Loose connections	perform pre-startup check for loose connections	Tighten loose connections
Input current imbalance greater than 3% (not applicable for single phase drives)	Problem with mains power (see Alarm 4 input phase loss description in the Warnings and Alarms table)	Rotate input power leads into the frequency converter one position A to B, B to C to A.	If imbalanced leg follows the wire, it is a power problem. Check mains power supply.
	Problem with the frequency converter	Rotate input power leads into the frequency converter one position: A to B, B to C, C to A	If imbalance leg stays on same input terminal, it is a problem with the unit. Contact the supplier.
Motor current imbalance greater than 3%	Problem with motor or motor wiring	Rotate output motor leads one position: U to V, V to W, W to U.	If imbalanced leg follows the wire, the problem is in the motor or motor wiring. Check motor and motor wiring.
	Problem with the frequency converters	Rotate output motor leads one position: U to V, V to W, W to U.	If imbalance leg stays on same output terminal, it is a problem with the unit. Contact the supplier.

Symptom	Possible cause	Test	Solution
Acoustic noise or vibration (for example, a pump impeller blade makes noise or vibrations at certain frequencies)	Resonances, for example, in the motor/pump system	Bypass critical frequencies by using parameters in parameter group 4-6* <i>Speed Bypass</i>	Check if noise and/or vibration have been reduced to an acceptable limit
		Turn off over-modulation in 14-03 <i>Overmodulation</i>	
		Change switching pattern and frequency in parameter group 14-0* <i>Inverter Switching</i>	
		Increase Resonance Dampening in 1-64 <i>Resonance Dampening</i>	



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