

Wave System Trouble Shooting Guide

Fault	Observation	Suggested Problem	Remedy
The Screen is blank	The pc power light is on	Emergency stop circuit	Check the red buttons are fully out and press reset
		PC 2 fuse or circuit breaker	Reset breaker 2FS13 check fuse F2 and press reset
	The pc power light is off	No power to the system	Check supply (green and red led on phase monitor = ok)
	The rotary pump is running	PC power settings / screen off	Touch the screen, switch on the screen using the button, check power settings
		PC2 circuit breaker	Reset breaker 2FS13 in the cabinet
	The safety relay inputs blink	Yellow relay inputs flash I1/I2, I3/I4	Turn off main isolator, pull out stop buttons and restart the system
	Phase monitor on, will not reset	Safety relay control fuse has blown	Change fuse F2, reset breaker 2FS1, restart the system
	No leds lit in the safety relay	Emergency stop failure	Contact wordentec, replace the MU or DI module check 2F1
	All looks good but screen blank	Unknown starting sequence	Power off wait 1 minute. Check Stop buttons are out and restart
Screen on but shows no input	The green screen light is on	The pc is not switched on	Switch on the pc, check breaker 2FS1 is up
	The pc is on and fan running	PC cable/ graphics card fault	Check connections, swap to the other graphics card, restart the PC
Screen on software not running	Wordnetec icon not in taskbar	The software autostart failure	Manually boot the software from the touchscreen icon or program menu
Software running showing errors	Check taskbar for multiple wave instances	The operator has started software over another instance	Close down all wave versions restart the pc and wait for the auto start
	Red box showing communication fault	Incorrect startup of the wave system, comms fault	Turn the system off at the main isolator, wait 1 minute and restart
		Corrupted ini file settings of communication port number	Check the ini file at [C:\program data\wordentec\wave\] for port numbers
Touchscreen doesn't respond	The keyboard and mouse work ok	Screen software not running, PC or screen issue	Restart the PC and screen, check the cable and com port assignment (rs232)
Pump controls not working	The rotary pump doesn't start	Rotary pump breaker or motor overload has tripped	Check/ reset breaker 2FS10. Check the pump is plugged in
		The pump controller is not running	Check the green flashing led at the base of the VCP800 in the cabinet.
		The rotary pump is broken	Check the electrical supply at the pump, replace or repair the pump
	The pump starts then stops	There is no compressed air to operate the valve	Check the status messages for air failure. Check air supply is 4-6 bar
	The pump runs for 30 seconds	There is insufficient vacuum to make set point P3	Check the pump and vacuum lines. Check P3 pirani setpoint and reading
The diff pump does not start	The diff pump mimic led remains red	There is insufficient vacuum to make P1 set point	Check P1 pirani gauge set point. Actual pressure must be less than set point
	The diff mimic led flashes red/green	This means the system has tried to start the pump	Check breaker 2FS10. Check the supply to the pump, reset the overtemp
Diff started but diff led flashing	The pump appears to be getting warm	This is normal operation, waiting for diff warm timer	Wait for the timer to expire 30-40minutes. Adjust diff warm timer
Diff warm, will not finish roughing	The diff led is flashing red/green	There is insufficient vacuum to reach P2	Check the chamber gauge and P2 threshold. Adjust P2 maximum SP= 8.0-1
	P2 set point has not been met	The rotary pump is faulty/ there is a gross leak in the line	Check the vacuum lines for leaks, check the rotary pump pressure <5.0E-01
	System has reverted back to standby	Rough out time is unexpectedly long, timer expired	Check the system for leaks, perform a rate of rise test, remedy leaks / pump
The P2 pressure is at atmosphere	V2 valve open, rotary pump under load	The door has not been pulled shut	Check the door seal for obstructions, re-close the door press pump
		The door has been pulled shut but not fully	Check all of the gauge and feedthrough ports, one may have been removed
	No load on rotary pump door fully closed	The chamber gauge is not reading correctly check status	Remove the electrical gauge connector and re-connect. Check the output
High vac valve opens then closes	The open switch led does not turn green	Check the status message, valve open switch not working	Replace or adjust switch. Wire out the switch in the VCP if confirmed ok
	The pressure rises rapidly on valve open	There is a fault in the vacuum valve or pump system	Switch off the diff pump, allow to cool and investigate
Pump does not reach start pressure	Pressure drops but remains too high	There is a leak or excessive outgassing in the chamber	Check for leaks, check rate of rise and repair. Empty the chamber and test
	Leak checked and chamber emptied	There is something wrong with the pump system	Check the diff pump, valves and lines for correct operation
Heaters not working	The P2 and P6 set point leds are on	The HV contactor is not enabled	Check the cabinet doors are closed. Check the rear of the chamber door switch
	The chamber door switch body is flashing	The door switch did not operate correctly	Unplug the door switch cable and reconnect. Press HV on, manual screen
	The chamber door switch light is solid green	The safety system has detected a fault HV remains off	Check the safety relay inputs I5+I6/I7+I8. All should be on. If flashing restart
	The HV is on , no heater output, LED on	The maximum heater output is set too low	Ensure the maximum heater output is set to a value above 10%
		The chamber temperature is above the set point	Increase the set point to check that the heaters work ok if unsure
		The heater fuse has blown / the breaker has tripped off	Replace thyristor fuse, reset the breaker 2FS20. Check the continuity of the bulbs

Code	Action	Description	Possible Cause	Remedy
1001	Shutdown	High vacuum pump water flow low	The water supply to the diff pump is too low	Check for leaks, check the flow taps, check the water supply, check for blockages. Adjust setpoint
1002	Shutdown	Failed to maintain backing vacuum	The backing pressure is above the set point P3	Check the pump system and vacuum lines. Adjust the set point P3
1003	Shutdown	Baffle not cold after cool down time	The baffle cool switch has not become good, timer expired	Check the baffle cooler and adjust the switch point. Check and adjust the water flow
1004	Shutdown	Diff pump ready signal gone away	The diff pump has cooled during pumping after being ok	Check the breaker 2FS11 in the cabinet. Check the heater current and connections
1005	Shutdown	Air supply has failed	The air has been switched off, the switch point is too high	Check the air supply is between 4 and 6 bar. Adjust the air regulator, adjust the switch
1009	Shutdown	Diff pump over temperature	The diff pump is too hot and the snap switch has activated	Check the water temperature and flow. Check the wiring and replace the snap switch
1041	Shutdown	V1 backing valve not opening	Air supply not present, vcp output fuse, switch not working	Check fuse F4, check green light for the output at 407-2. Check air supply check valve/switch
1042	Shutdown	V2 roughing valve not opening	Air supply not present, vcp output fuse, switch not working	Check fuse F4, check green light for the output at 407-2. Check air supply check valve/switch
1043	Shutdown	V3 high vacuum valve not open	Air supply not present vcp output fuse, switch not working	Check fuse F4, check green light for the output at 407-2. Check air supply check valve/switch
1044	Hold	V4 vent valve not open	Air supply not present vcp output fuse, switch not working	Check fuse F4, check green light for the output at 407-2. Check air supply check valve/switch
1051	Shutdown	V1 backing valve not closed	Valve jammed, switch not working feedback disconnected	Visually check the valve position and rectify if necessary, re-connect wire, replace the switch
1052	Shutdown	V2 roughing valve not closed	Valve jammed, switch not working feedback disconnected	Visually check the valve position and rectify if necessary, re-connect wire, replace the switch
1053	Shutdown	V3 high vacuum valve not closed	Valve jammed, switch not working feedback disconnected	Visually check the valve position and rectify if necessary, re-connect wire, replace the switch
1054	Shutdown	V4 vent valve not closed	Valve jammed, switch not working feedback disconnected	Visually check the valve position and rectify if necessary, re-connect wire, replace the switch
2001	Warning	Check compressed air supply	The system has detected a failure of the air supply	Rectify the fault, increase the pressure to 4-6 bar adjust the switch check the vcp input
2003	Warning	Check diffusion pump water	The water flow has fallen close to the minimum vcp set point	Check for leaks and blockage. Increase water flow or balance the water flow across the panel
9001	Shutdown	Diffusion pump water supply poor	The warning time has expired. Flow was not restored	Check for leaks and blockage. Increase water flow or balance the water flow across the panel
9002	Abort	Crystal water flow below minimum	There is a blockage in the circuit, there is an air lock or leak	Balance the water flow across the panel, verify flow and if ok adjust the set point
9003	Abort	Source 1 water flow poor	There is a blockage in the circuit, there is an air lock or leak	Balance the water flow across the panel, verify flow and if ok adjust the set point
9004	Abort	Source 2 water flow poor	There is a blockage in the circuit, there is an air lock or leak	Balance the water flow across the panel, verify flow and if ok adjust the set point
9020	Abort	Substrate carrier not turning	Set point at zero, planetary jammed, belt broken, motor trip	Check the set point is >0, try the rotation in manual, check the belt, check breaker 2FS12
9021	Abort	Gas flow bad	The actual measured gas flow is not as expected	Check the gas bottle/supply is switched on. check the MFC connections, check the gas filter
9022	Abort	Substrate heater fault	There is no current at the lamps or there is a short circuit	Vent the chamber and check the bulbs, check the feedthrough to lamp body wiring and ceramics
9023	Power off	Emergency stop circuit 1 fault	The EMO button has been pressed, unsafe condition present	Turn off the power at the main isolator, identify the cause, rectify and restart the system
9024	Power off	Emergency stop circuit 2 fault	The EMO button has been pressed, unsafe condition present	Turn off the power at the main isolator, identify the cause, rectify and restart the system
9025	Abort	The HV has been switched off	Safety sensor tripped, the pc watchdog timer has failed	Check the vacuum safety sensor. Remove any conflicting software ie antivirus, office etc
9026	Abort	Chamber door not safe	The dual circuit chamber door switch has detected an error	Check the chamber closed switch internal lamp is solid green. If red or flashing reclose the switch
9027	Abort	The HV contactor is held off	The safety system has detected a fault and cannot proceed	Check the status lamp of the yellow safety relay MU. A red light indicates a fault in the system
9028	Abort	The chamber walls are too hot	The thermal cut out switch is active due to high temperature	Check the connections to the switch. Check the heater set point and water flow
9029	Abort	No more crystals left	The crystals have all failed the sensors are unplugged	Change the crystals, check the wiring. Good crystals have a frequency of 5.998 when new
9030	Shutdown	Mains supply fault	There has been an interruption to the machine power supply	Check the wiring to the machine. The phase relay has a green and red led on when good
9031	Abort	Segment has timed out	There is insufficient material or was unable to reach thickness	Check the sources and settings, the segment timer must allow enough time to complete
9032	Abort	Substrate thermocouple 1 bad	There is a disconnection of the thermocouple reads full scale	Replace the thermocouple, check the plug is connected, check the beckhoff module led is green
9033	Abort	Substrate thermocouple 2 bad	There is a disconnection of the thermocouple reads full scale	Replace the thermocouple, check the plug is connected, check the beckhoff module led is green
9034	Abort	Thermocouple averaging impossible	There is a disconnection of a thermocouple reads full scale	Replace the thermocouple, adjust the process to use a single sensor in the case of failure
9035	Abort	Source 1 thermocouple bad	There is a disconnection of the thermocouple reads full scale	Replace the thermocouple, check the plug is connected, check the beckhoff module led is green
9036	Abort	Source 2 thermocouple bad	There is a disconnection of the thermocouple reads full scale	Replace the thermocouple, check the plug is connected, check the beckhoff module led is green
9037	Abort	Chamber pressure gauge fault	The chamber gauge reading is outside normal operating limits	Check the connection, clean the gauge head, replace the gauge
9038	Abort	Chamber pressure too low	Fault with the measuring head, bad setting of P9	Check the set point P9, this should be just below the normal process pressure, check the gauge
9039	Abort	Chamber pressure too high	Fault with the measuring head, bad setting of P10	Check the set point P10, this should be just above the normal process pressure, check the gauge
9040	Abort	There is no heater current	There is no current at the lamps or there is a short circuit	Vent the chamber and check the bulbs, and lamp wiring, check the breaker 2FS20 and fuse
9041	Abort	There is no current source 1	There is a bad connection to the boat, fuse gone, breaker trip	Clean the clamps and replace the boat. Check the breaker 2FS21 check the thyristor fuse
9042	Abort	There is no current source 1	There is a bad connection to the boat, fuse gone, breaker trip	Clean the clamps and replace the boat. Check the breaker 2FS22 check the thyristor fuse
9043	Shutdown	There is no diff pump current	There is a fault with the heating element or the power supply	Check the heater continuity, check the hot zone wiring check the breaker 2FS11
9044	Shutdown	Diff water over temperature	The diff water temperature set point has been exceeded	Check the chiller and water supply, check the thermocouple and connections
9045	Shutdown	Water inlet temperature exceeded	The temperature of the incoming water is too high	Check the inlet thermocouple and connections. Check the chiller and water supply
9046	Abort	No argon gas pressure	The argon gas pressure switch has detected a fault	Check the gas bottle /supply is switched on and the pressure is >0.5 bar. Adjust the switch
9047	Abort	No nitrogen gas pressure	The nitrogen gas pressure switch has detected a fault	Check the gas bottle /supply is switched on and the pressure is >0.5 bar. Adjust the switch