3.6 Service Mode for the Zent2 Version Centrifuge Electronics

To activate the service mode:

Press Cursor Up key
Press Enter three times, holding down the key the third time until the Service Mode appears
The time display = 'Ser'

The program and speed fields display the following parameters:

program	speed	description
0	ver	software version and centrifuge type
1	sen	sensor status
2	imb	N/A
3	error	error table
4	eep—	erase EEPROM or Door Lockout Timer
5	imbs	N/A
6	imbf	N/A
7	led888	LED test
8	zeit	accumulated run time
9	zykl	cycle mode

Select the program using the ↑ and ↓ keys.
To exit any service program press STOP.

Zent2 hardware overspeed jumper settings:

Centrifuge Model	Overspeed (Y Mode)	Overspeed (Δ Mode)
Spinchron DLX	4424rpm (equivalent to 7413 rpm for 10ppr tach) S5, S3, S1	N/A

0 Software Version and Centrifuge Type

Press ENTER to activate.
The time and speed fields display the following parameters:

time = Software Version
speed = Centrifuge Type

1 Sensor Status

Press ENTER to activate.
The program, time and speed fields display the following parameters:

ACC/DEC =
 digit 1, i.e. left = 1 inverter bus charged, 0 inverter bus discharged
 digit 2, = 1 inverter enabled, 0 inverter not enabled
TIME =
 digit 1, i.e. left =1 door closed, 0 door not closed
 digit 2 = n/a
 digit 3 = 1 chamber overtemperature (O/T), 0 no chamber O/T
SPEED =
 digit 1, i.e. left = 1 no inverter O/T, 0 inverter O/T
 digit 2 = 1 imbalance, 0 no imbalance
 Note: for the DLX this signal is inverted
 digit 3 = 1/0 rotor ID sensor output
 digit 4 = 1/0 tach sensor output
 digit 5 = 1 rotor turning, 0 rotor stopped at least 2 seconds

2 Imbalance Test N/A

3 Error Table

Press ENTER to activate.
The 14 most recent errors are stored in the error table. Pressing the ↑ and ↓ keys scrolls through the list of errors. Pressing RPM deletes the error from the list.
The time and speed fields display the following parameters:

time = sequence number
speed = error number

4 Erase EEPROM or Door Lockout Timer
The speed field displays 'ERASE'. Two options are available by pressing the following keys:
ENTER = deletes the error table; exits Service Mode
not effected: elapsed run time, cycle counter,
RPM = deletes errors and overrides Door Lockout Timer
not effected: elapsed run time, cycle counter; exits Service Mode
The accumulated run time and cycle counter values can be deleted in programs 8 and 9, respectively.

5 Static Imbalance Mode N/A

6 Dynamic Imbalance Mode N/A

7 LED test
Press ENTER to activate.
Every discrete LED and seven segment LED digit is turned ON.

8 Accumulated Run Time
Press ENTER to activate.
The speed and time fields display the following parameters:

speed = time =
hhh & hh-mm

A maximum of 99999 hours and 59 minutes can be displayed, about 11 years.

Pressing RPM clears the stored elapsed time in the EEPROM.
Pressing STOP or ENTER exits the program.

9 Cycle Mode
Press ENTER to activate.
The centrifuge can be programmed to cycle automatically. The time and speed fields display the following parameters:
time = wait time (minutes)
speed = cycle counter

The following keys are used to program the cycle mode parameters:

↑ and ↓ = wait time (1minute increments)
RPM = clear the cycle counter
START = begin cycling and start the centrifuge
FSTOP = end cycling and stop the centrifuge
STOP or ENTER = exit the program

3.7 Error Code listing for the Zent2 Version Centrifuge Electronics

No.	Type	Description	Service Procedure
	System CPU:		
1	fail	CPU test after power up failure	replace EPROM, replace Control Board
2	stack	stack overflow	same as error #1
3	CPU RAM	CPU RAM failure	same as error #1
4	RAM external	RAM failure	same as error #1
5	EPROM	checksum invalid	same as error #1
6	comm	communication fault	same as error #1
7	comm	Keypad to Display communication error	connection, replace Keypad and/or Display Board
8	watchdog	frequent tripping	+5volt power supply on Control Board, replace EPROM, replace Control Board
9	status	disallowed SW traps	replace EPROM, replace Control Board
		Motor CPU:	
11	fail	CPU test after power up failure	replace EPROM, replace Control Board
12	stack	stack overflow	same as error #11
13	CPU RAM	CPU RAM failure	same as error #11
14	RAM external	RAM failure	same as error #11
15	EPROM	checksum invalid	same as error #11
16	comm	communication fault	same as error #11
17	reset	Motor CPU reset	same as error #11
18	watchdog	frequent tripping	5 volt power supply on Control board, replace EPROM, replace Control Board
19	status	disallowed SW traps	replace EPROM, replace Control Board
		Tach, System CPU:	
20	unstable	interrupt faulty	tach sensor to Control Board connection tach sensor cable grounding, tach sensor / magnet ring gap, replace tach sensor
21	overspeed	RPM exceeds limit	same as error #20
22	unstable	noisy or jittery	same as error #20
23	compare	inconsistent reading between motor and system CPUs	same as error #20
24	control	final speed not reached	AC input voltage, how easily the rotor turns, easily the rotor turns, replace Power board, replace drive
25	drive	inverter problem	AC input voltage, replace Power board

No.	Type	Description	Service Procedure
27	PWM check	check PWM signal or feedback	same as error #26
		signal absent	
28	no tach	start without tach	same as error #20
			lid lockout requires power to be left on for
			12-13 minutes, or can be cleared with
			service mode #4, replace Power board, replace latch
29	no tach	lose tach during run	same as error #28
30	compare	inconsistent overspeed limit	same as error #26
		between motor and system CPU's	
		Tach,	
		Motor CPU:	
31	overspeed	RPM exceeds limit	same as error #20
32	unstable	noisy or jittery	same as error #20
33	compare	inconsistent tach reading between	same as error #20
		motor and system CPU's	
34	control	final speed not reached	same as error #24
35	drive	inverter problem	same as error #25
36	monoflop	no indication of rotor turning	replace EPROM, replace Control board
		even though tach O.K.	
37	PWM	check PWM signal or feedback	same as error #26
		signal absent	
38	no rotor	start without rotor	same as error #20
39	no tach	no tach indication	same as error #20
40	overspeed	hardware overspeed test failure	overspeed jumper settings, replace
			Control Board
41	overspeed	hardware overspeed detection,	same as error #40, Check Tach cable routing
		at max rotor speed	
42	imbalance	hardware imbalance test failure	imbalance sensor and Control board
			connection, imbalance sensor position,
			replace imbalance sensor
43	imbalance	DC offset not in range	same as error #42
	offset		
50	status	floating point operation error,	replace EPROM, replace Control board
		overflow	
51	status	floating point operation error,	same as error #50
		overflow	
52	status	floating point operation error,	same as error #50
		underflow	

No.	Type	Description	Service Procedure
		EEPROM:	
69	type	not compatible	EEPROM loose,
70	type	version not compatible with	same as error #69
		SW version	same as error #69
71	hardware	not responding	same as error #69
72	verify	not responding	same as error #69
73	checksum	program data not valid	same as error #69
74	checksum	free area not valid	same as error #69
75	checksum	imbalance not valid	same as error #69
76	checksum	offset not valid	same as error #69
77	checksum	program variables not valid	same as error #69
		Door:	
80	transistor	transistor failure	replace Power Board,
81	monoflop	rotor turning with door open	turning rotor by hand with the door open,
			replace door latch, tach sensor
82	test	door lock test signal failure	door latch to Power Board connection,
			replace Power, replace Control board
83	open failure	door won't open	replace latch, same as error #82.
98	rotor ID	invalid rotor ID	rotor ID sensor to rotor gap, rotor missing
			magnets, rotor ID sensor and cable
99	rotor ID	invalid rotor ID	wrong rotor ID keyed in by user, same as error #98