

## 2.2 Trouble Shooting

Error Indication	Error Cause	Possible Error Source	Corrective Procedure
Displays remain dark	no mains voltage supply	mains switch with integrated fuse or fuses on main board	switch on again, disconnect electric. components success., search for other faults
		mains fuse or circuit breaker failed	check fuse or circuit breaker and replace or switch on again
		faulty mains cord or instrument socket	check instrument cord and socket, replace defective parts
	no low voltage supply for indication board	faulty connection from CPU to indication board	check connections on CPU, indication board and connecting leads, replace defective parts
		faulty indication or CPU board	replace main board completely
display shows <b>BOOTING</b>	CPU program reset may be caused by EMI	reduced voltage supply (>10%)	remedy the failure if the voltage drops often, use a voltage stabiliser
		bad or missing ground connection	check all ground connections and the ground connection of all boards
drive makes <b>noises</b> -no good separation result	mechanics	wear out of motor rubber mount	replace motor rubber mounts (at least every three years)
	electrical	defective terminal connection, faulty lead or motor winding	winding resistances -see test points
		faulty electronic	replace main board
<b>"PUSH OPEN"</b>	locking drive is not supplied with voltage	faulty driving circuit	check voltage for drive motor check switch. after power ON replace the main board
	Latch motor	faulty motor winding	replace complete latch
	lid is not correctly locked	lid bolt is jamming	push lid centrally into lock and press the key again
		lid is deformed	re-adjust the lid centrally

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<b>„XXX max speed“</b>	wrong selection of detected rotor	inadmissible speed or rcf value was pre-selected	press start again (within 15s), else wait for rotor standstill, lid OPEN/CLOSE, set value, start
<b>“E-98 IMBALANCE LOAD“</b>	imbalance run	rotor not symmetrically loaded	open lid, check rotor loading, close lid again and restart
		base is not sturdy enough and comes into vibrations	change or reinforce the base (table, lorry with lockable wheels, etc.)
		centrifuge drive is not correctly levelled	level the drive correctly by means of unit's feet
		rotor itself has imbalance	rotor must no longer be used, send back to Kendro
		drive shaft or rotor fixing is damaged	replace collet chuck or motor
		imbalance sensor	replace sensor board
		circuits of main board	replace the main board
<b>“E-97 ERROR LID LOCK”</b>	lid was opened manually during run	forbidden intervention emergency opening device must only be used at standstill	close lid immediately, let the rotor spin out, then turn power OFF/ON
	protection circuit (24V) interrupted during run	defective micro switch or leads or connectors to micro switch are interrupted	check leads and connectors to micro switch, in case of a faulty micro switch, replace them
<b>“ERROR – read manual”</b>	standard text for errors with error code	as shown in the Display	read more in the manual
No reaction of the overlay	overlay or overlay adaptor has no contact	ribbon cable could be broken, or has no contact	change overlay or contact of the ribbon cable

## 2.3 Error-Code

<b>Error Indication</b>	<b>Error Cause</b>	<b>Possible Error Source</b>	<b>Corrective Procedure</b>
„E-01“ message appears in speed display	System clock pulse not stable	hardware fault on main board	change main board
„E-02“ message	Program sequence was disturbed	internal Software problem	replace main board
„E-03“ message	Stack overflow	internal Software problem	no action in the field possible
„E-04“ message	Stack underflow	internal Software problem	no action in the field possible
“E-05” message	Reset by HW watchdog timer	software problem	no action in the field possible
“E-08” message	Check sum error E-PROM	E-PROM failed	replace main board
“E-09” message	Check sum error NV RAM	NV RAM failed	replace NV RAM, or main board
“E-10” message	NV RAM not initialised	initialising of NV-RAM is not valid	check NV-RAM and socket, insert the correct NV-RAM
“E-11” message	NV RAM doesn't match E-PROM	check versions of NV RAM and E-PROM	replace NV RAM
“E-12” message	Check sum error NV RAM	NV RAM failed	switch OFF/ON, replace NV RAM
“E-13” message	Check sum error NV RAM	NV RAM failed	replace NV RAM
„E-14“ message	Chamber over temperature: display >50°C	compressor didn't work	check leads, terminals, start relay, capacitor, cooling system
		faulty cooling cycle	exp. valve, refrigerant loss
„E-15“ message	Open temp. sensor	check sensor, control circuits	replace sensor or main board
„E-16“ message	Short cut temp. sensor	check sensor, control circuits	replace sensor or main board

### Error-Code

<b>Error Indication</b>	<b>Error Cause</b>	<b>Possible Error Source</b>	<b>Corrective Procedure</b>
„E-17“ message	Wrong or faulty rotor detection	a wrong rotor was installed	wait for standstill, open the lid and install a correct rotor
		mains voltage failure	press stop key, wait for standstill and restart
		faulty detection circuit	replace the main board
„E-18“ message	Bucket code not valid for this rotor	no bucket code available	check bucket code with the bucket number, change NV- RAM
„E-19“ message	Rotor code not programmed	wrong rotor installed	check rotor
		interference during recognition	check rotor recognition board and wiring
„E-20“ message	Rotor code not valid	see E-19	
„E-21“ message	Recognition disturbance	wiring	check wiring of the sensors
„E-22“ message	Speed signal disturbance	wiring	check wiring of the sensors
„E-23“ message	Speed control measuring disturbance	2 <sup>nd</sup> check was done by rotor recognition system	check speed detection board
„E-24“ message	Latch blocked	micro switch failed, de-adjusted, latch	replace latch
„E-25“ message	Time out latch open	micro switch failed	check latch PCB, change latch
„E-26“ message	Time out latch close	micro switch failed	check latch PCB, change latch, switch off/on

### Error-Code

<b>Error Indication</b>	<b>Error Cause</b>	<b>Possible Error Source</b>	<b>Corrective Procedure</b>
„E-27“ message	Signal given by latch not valid	wrong identified signal after power “on”	switch OFF/ON, change latch
„E-28“ message	Wrong sense of rotation	motor- wires at the plug mixed	check wiring at terminal, and contact of the plug
„E-29“ message	Motor doesn't turn	PCB faulty, see E-21, E-22, no rotor installed	install rotor, change PCB rotor recognition, speed detection
„E-30“ message	Control-voltage interruption	PCB failed	replace PCB
„E-31“ message	over-temperature motor >150°C	hot motor, no air circulation	check motor, check grill for dust
„E-32“ message	Over- temp. Electronic >90°C	faulty main board	replace main board
„E-33“ message	High-pressure Cooling system	faulty high pressure switch, blocked system or air intake	inspect cooling system, clean air intake
„E-34“ message	Over-voltage	brake resistor, main board	check brake resistor, replace main board
„E-35“ message	Over-current	main board	replace main board
„E-36“ message	NMI interruption	over voltage or over-current	replace motor assy.
„E-40“ message	Acceleration of the unit is too slow	big imbalance motor or main board faulty	check rotor loading, motor and main board
„E-41“ message	Offset voltage from the imbalance sensor is in a inadmissible area	imbalance sensor faulty wiring from the speed detection board to the main board is broken	replace speed detection board check / replace the wiring

<b>Error Indication</b>	<b>Error Cause</b>	<b>Possible Error Source</b>	<b>Corrective Procedure</b>
“E-44”	DC link voltage too low	line voltage <10% faulty mainboard	correct line voltage replace mainboard
“E-45”	Safety test during restart failed	during spin, switch OFF/ON, speed detection fault	change speed detection, motor plug detached
“E-61”	Latch motor not disconnected	relay not disconnect latch motor	replace main board
„E-70“	CLASS A trap software break	wrong parameter in the controller	replace main board
„E-71“	Software reset	internal controller failure	replace main board
„E-72“	Incorrect rotor recognition	software failure	no action in the field
„E-73“	Incorrect user interface identification	user interface not known by NV-RAM	replace NV-RAM
„E-74“	Motor control circuit failed	control circuit not set	replace main board
„E-75“	Faulty RAM	faulty data content in the controller	replace main board
„E-76“	Wrong information DC bus	relay not disconnect motor after lift lid	replace main board, check overtemp. switch of the resistor
„E-77“	Fault in configuration check	software faulty configured the controller	change main board
„E-78“	Set speed> max speed	signal for speed fault	replace main board

### Error-Code

<b>Error Indication</b>	<b>Error Cause</b>	<b>Possible Error Source</b>	<b>Corrective Procedure</b>
„E-79“	rotor speed > max speed	see E-78	replace main board
„E-80“	rotor indication difference	see E-78, failure by contrast the speed parameters	replace main board
„E-81“	redundancy Speed measuring failure	secondary measuring was faulty	replace main board
„E-97“	Door open during run	emergency release pulled during run	close door, check wiring of the latch
„E-98“	Imbalance	check rotor, AV mounts, rubber boot	lubricate trunnions, replace AV mounts, rubber boot
„E-99“	$n_{set} > n_{max}$	line voltage interruption during run	wait for standstill - power off/on to reset