## **Troubleshooting**

#### Where to find ...

**Print quality and the printing process**: find descriptions on general troubles with the extrusion of filament, aborting of print jobs, unsatisfying quality of printed and the like.

**Mechanical issues**: provides an overview on issues arising from or leading to mechanical faults such as dry shafts or wrong axes positions.

**Electrical problems and communication/network errors**: look up what to do if the connection between the 3D printer and the PC cannot be established, the boot process fails or the .log-file provides false time entries.

**Slicing settings or CAD data**: a list of topics not directly based on faults of the 3D printer but generally influencing the print result negatively or making operation uncomfortable.

**Error messages**: a detailed description of error messages appearing in the .log-file.

### **Defects / Issues**

**Printing process / print quality** 

No.	Symptom	Possible cause(s)	To do	Additional information
		- bent or constricted supply hose - false insertion of filament strand in	✓ Make sure that: - the filament is coiled spirally and free of kinks; - the supply hoses are not constricted, free of kinks and laid out in adequate radii; - the filament is inserted in the inlet at an angle of 90°	Software manual v1.0.5 or Software manual v1.1.0 <sup>1</sup>
		False idler lever preload.	✓ Measure and correct the idler lever tension.	Service guide, Knowledgebase
		Flexible (e.g. textile fibers) or solid particles (e.g. soot) clogging the nozzle tip.	<ul> <li>Disassemble and clean the extruding components.</li> </ul>	Disassemebly, Cleaning
		Print bed leveled too close. Nozzle tip clogs due to internal pressure.	✓ Run the [Print Bed Leveling] wizard.	Tips & Tricks, Software manual v1.0.5 or Software manual v1.1.0 <sup>1</sup>
P1	Print job finishing correctly but extrusion stops midway.  Drive gear grinding the filament.	Filament diameter exceeds tolerances.	<ul> <li>✓ Measure the filament diameter and roundness at at least 5 points with a distance of 0.5 m. Measure minimal two times at the same position at an angle of 90°. The diameter must lie between 2.75 - 2.95 mm (2.85±0.1 mm)</li> <li>✓ Also check that the filament is free of kinks and bulges.</li> <li>If the diameter exceeds the stated value or there are other irregularities, there is a manufacturing fault in the filament. Contact your filament supplier for service.</li> </ul>	Tips & Tricks,  If you ordered the filament directly from Kühling&Kühling, contact our technical support for replacement.  Technical support
		Print speed too high for the currently installed material.	The standard settings for the RepRap Industrial have been extensively tested with our snow-white ABS. Other materials show different melting behavior and friction. Try the following when printing new materials:  Decrease the print speed.  Increase the extrusion temperature.  Always use very latest Slic3r profiles from our GitHub repository as starting point for individual profile customization.	Knowledgebase Slic3r software manual Kuehling&Kuehling
			✓ Check the quality of the extruded filament and increase the extrusion temperature 5 - 10 °C if required.	Knowledgebase
		due to lack of heat transfer between heating block and melter.	✓ Remove the heating block, thoroughly clean the bore of plastic residues if necessary (only sheer metal must remain) and re-install. Fasten the set screw tightly.	Service guide
		Increased friction in the hot-end barrel	due to:	
		clogging or blocking	✓ Deinstall the barrel and check for material residues. Clean the barrel thoroughly if required.	Service guide, Cleaning recommendation, Knowledgebase
		- deformation, scratched inner surface	✓ Deinstall the barrel and check for bends and excessive scratching of the inner surface. If such is present, replace the hot-end.	Service guide, order spare parts

No.	Symptom	Possible cause(s)	To do	Additional information
	Warping of the print object during or after the print.  Extruded strands do not merge,	Poor first layer adhesion		Knowledgebase
		Print bed leveled too far away.	✓ Run the [Print Bed Leveling] wizard.	Tips & Tricks, Software manual v1.0.5 or Software manual v1.1.0 <sup>1</sup>
		Print bed temperature is too low.	✓ Check temperature in the Manual Control menu; if necessary, increase print bed temperature in the Slic3r software (Filament settings).	Slic3r software manual
		are deformed		✓ Adjust the Slic3r settings for the first layer.
	instead of being	Separating agents (e.g. fingerprints) on the print bed	✓ Clean the print bed with acetone.	Service guide
	pressed.	<b>Z-positioning</b> inaccurate due to:		
	Strands are separated by print	Stick-and-slip effects when shafts are very dry (see M1 also).	✓ lubricate with Ballistol Universal NOTICE Only valid for RepRap Industrial 3D printers up to hardware revision 1.1.0.	Service guide
		Settling processes of the spindle adjusting ring (e.g. during transport).	✓ Reposition the adjusting ring and refasten the set screw.	Follow the description given in the Service guide
Р3	Bad layer binding	Print bed / extrusion temperature is too low.	✓ Check temperatures in the Manual Control menu; if necessary, readjust the extruder temperature in the Slic3r software (Filament settings). ✓ Check the material presets in the Setup menu; open the backend-setup and adjust values if necessary	Slic3r software manual
	Printed circular structures (holes, cylinders) are deformed and out of round.	uctures (holes, linders) are Backlash in the X- and/or Y-axis. formed and out round.	✓ Calibrate backlash.	Service guide
			✓ Check timing belt tension.	Service guide
P4 cy			✓ Check for loosened X-axis and/or Y-axis drive pulley. Refasten the set screws with a #1.5 Allen key. NOTICE Only valid for RepRap Industrial 3D printers up to hardware revision 1.1.0.	Technical support
P5	Print starts off- center	Wrong print bed center or origin settings in Slic3r.	✓ Check for correct settings according to your Slic3r-hardware combination.	Service guide
	Gaps between perimeters.  Bad layer binding.  Loose, openstranded top/bottom layers.  Loose, uneven honeycomb infill.	Under-extrusion; extrusion multiplier too low.	✓ Run the [Extrusion Calibration] wizard; save the calculated multiplier in the Slic3r filament profile.	Software manual v1.0.5 or Software manual v1.1.0 1, Tips&Tricks, Slic3r manual
P7	Filament bends and twists between drive gear and hotend inlet, the filament is not conveyed to the	Flexible materials (e.g. TPEs): the gap between drive gear and hot-end inlet is too wide for printing without modification.	✓ Download, print and install the required adapter at Kühling&Kühling GitHub	Knowledgebase
		Build chamber temperature is too high for temperature-sensitive materials.	✓ Check the Vicat softening temperature of the material and reduce the build chamber temperature to a value 5 - 10 °C below.	Tips&Tricks

No.	Symptom	Possible cause(s)	To do	Additional information
P8	Print job cannot be finished although every mechanical or electronic issue has been checked. Strange artifacts appear in printed object.	.stl-file corrupted	✓ Check suitability of .stl-file for 3D printing.	Tips&Tricks
P9	Extrusion temperature drops mid-print and extruder drive stops. All axes keep moving.	Broken thermistor at the heating block of the extruder. see EM1 also	✓ Check cable connections of the thermistors for damage or wear. If the fragile cables of the thermistor are broken, the heating unit must be replaced.	Limit values are: 0 300 °C Service guide order spare parts
P10	Drop formation	high-resolution models result in G- code-resolution finer than the printer can render; increased memory usage leads to buffer data loss and pause times.	✓ Increase the <i>minimum detail</i> resolution of the Slic3r software.	Service guide, Slic3r software manual
	(DIODS)	Downsizing (scaling) of high- resolution models in Slic3r increases the resolution further; 3D printer cannot translate resolution adequately	✓ Downscale the model before exporting it as .stl and adding it to Slic3r.	

## Mechanical

No.	Symptom	Possible cause(s)	To do	Additional information
M1	Juddering of the print table during homing.	Very dry shafts lead to increased stick-and-slip effects.	✓ Lubricate the Z-shafts with Ballistol Universal NOTICE Only valid for RepRap Industrial 3D printers up to hardware revision 1.1.0.	Service guide
M2	Increasingly rough vertical surfaces	Very dry shafts may lead to increased vibrations of the extruder.	✓ Lubricate the X- and Y-shafts with Ballistol Universal NOTICE Only valid for RepRap Industrial 3D printers up to hardware revision 1.1.0.	Service guide
М3	Homing the X-axis leads to extruder head collision and blackout of the	X-axis limit stop bent by crash due to misinterpreted home-position.	✓ Disconnect the printer from the power supply and carefully bend back limit stop with tweezers.  NOTICE  Always power down the 3D printer before touching electronic components with conductive tools to avoid damages by short-circuiting.	
	controls.	G-code home positions of X-axis incorrect.	✓ Check Slic3r for correct axes settings (depending on the release versions of the 3D printer version and the slic3r software).	Service guide

# Electronic, network, communication

No.	Symptom	Possible cause(s)	To do	Additional information
E1	Status indicator on the touchscreen diplays "Offline" (after booting).	USB-to-Serial chip (RUMBA board) is in DFU mode (firmware programming mode); firmware is lost or corrupted	✓ More information and remedy see ⇒	Service guide
E2	Upon boot, the touchscreen stays black for more than 5 minutes and will not display anything.	The operating system for the BeagleBone Black	✓ Switch off the power supply main switch, switch on again. If the system is successfully booting now, the problem was only temporary and is resolved.	
E2	Inside the electronics chamber, the block of three LEDs on the BeagleBone Black is solid blue (no flashing).	embedded computer could not be loaded from its SD card.	In case the behavior recurs frequently, the Micro-SD card may be malfunctioning.  ✓ Try building a new Micro-SD card as detailed in the Software & Firmware upgrade guide	Software & Firmware Upgrades
E3	Timestamps of log-file entries are incorrect and/or inconsistent.	Printer is connected to a local network that does not provide internet access (no gateway available).  LAN network is firewall protected.	✓ Check your network's firewall and internet settings → free internet access must be provided for NTP synchronisation through port 123/UDP	
	Timestamps of log entries are reset at restart.	The 3D printer cannot keep accurate time by itself, it needs to occasionally synchronize with a public NTP time signal server (e.g. during boot)	✓ re-configure the printer to fetch a time signal from an in-house NTP-server if available	Tips&Tricks

No.	Symptom	Possible cause(s)	To do	Additional information
	The web-interface is not contactable via the network.	Network cable disconnected.	✓ Check that the network cable at the rear cover of the electronic chamber is in place.	Manual
E4		URL spelling mistakes	✓ Check for correct spelling of the URL.	Software manual v1.0.5 or Software manual v1.1.0
		Network does not provide DHCP.		
		Printer and PC are not connected to the same network.	✓ Ask your system administrator for help.	
E5	The web-interface displays "Offline" while the 3D printer's touchscreen status indicator reads "Idle". The communication fails.	3D printer web-socket connection unavailable. Possible reasons (excerpt): - proxy-server or firewall settings - outdated internet browser versions - locked network ports etc.	<ul> <li>✓ Try using another PC and/or another internet browser.</li> <li>✓ Confer with your system administrator regarding:         <ul> <li>unblocked protocols/ports</li> <li>use of static or dynamic IP-adress</li> <li>firewall and/or network restrictions</li> <li>network proxy-server configuration</li> </ul> </li> </ul>	

### Slicing, CAD-files

No.	Symptom	Possible cause(s)	To do	Additional information
	readable in Slic3r drop-	Incompatibility of Slic3r (v1.1.7) and Windows operating software.	•	Tips&Tricks, Slic3r
S2	Crashing of Slic3r with .stl-file.	.stl-file corrupted	✓ Check suitability of .stl-file for 3D printing.	Tips&Tricks

<sup>1)</sup> If you are unsure about the valid software manual, check here.

### **Error messages**

The *Log* tab of the touchscreen and of the web interface contain the communication and operation commands of the RepRap Industrial since the day of initial commissioning, including ERROR messages about false statuses (e.g. overheating, connectivity).

The following list provides all possible ERROR messages that may be found in the log file together with an explanation on the possible causes and, if required, available remedying procedures. An ERROR message does not necessarily mean that the 3D printer has a malfunction. Such messages can also represent a status messages generated before another required process has been finished

and fed back.

Use the below list if an ERROR message appears in your log file and you are unsure about its meaning and effects.

No.	Message	Possible cause(s)/ effects	To do	Further information
EM1	Printer set into dry run mode until restart! followed by internal test (example): extruder 0: temp sensor defect extruder 1: working extruder 2: working heated bed: working	The named thermistor measured a limit value derivation. The measured temperature exceeded/came below the allowable limit value.	wear. If the fragile cables of the thermistor are	Limit values are: 0 300 °C Service guide Request a quote for the fully assembled replacement part via sales@kuehlingkuehling.de