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

No.	Symptom	Possible cause(s)	To do	Additional information
P1	Print job finishing correctly but extrusion stops midway. Drive gear grinding the filament.	Increased friction in the feed system by: - bent filament strand - bent or constricted supply hose - false insertion of filament strand in the inlet - wryly coiled filament spool - jammed dust wiping sponge	✔ 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
		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.	✔ Disassemble and clean the extruding components.	Disassemebly Cleaning
		Print bed leveled too close. Nozzle tip clogs due to internal pressure.	✔ Run the [Print Bed Leveling] wizard.	Tips & Tricks Software manual

		Filament diameter exceeds tolerances.	✔ 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)`
			
			✔ Also check that the filament is free of kinks and bulges.
			
			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.
				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 manual GitHub
		Extrusion temperature is too low due to deviation of value measured at the hot end heater and real temperature at the nozzle tip.	✔ Check the quality of the extruded filament and increase the extrusion temperature 5 - 10 °C if required.	Knowledgebase
		Target temperature is not reached 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
		False gap fill settings (Slic3r) effect over-extrusion and layer-wise adding up of material which leads to clogging of the nozzle due to internal overpressure.	✔ Set “gap fill speed” to `0` → Slic3r → Print Settings → Speed / Speed settings for print moves	Slic3r manual

No.	Symptom	Possible cause(s)	To do	Additional information
P2	Warping of the print object during or after the print. Extruded strands do not merge, are deformed and/or laid on the print bed instead of being pressed. Strands are separated by print head movement.	Poor **first layer adhesion**		Knowledgebase
		Print bed leveled too far away.	✔ Run the [Print Bed Leveling] wizard.	Tips & Tricks Software manual
		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 manual
		Wrong Slic3r settings	✔ Adjust the Slic3r settings for the first layer.	Tips&Tricks
		Separating agents (e.g. fingerprints) on the print bed	✔ Clean the print bed with acetone.	Service guide
		Z-positioning inaccurate due to:		
		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.	Service guide
P3	Layer separation	(see P6 also) Extrusion temperature is too low.	✔ Check the extrusion temperatures via the *Expert Control* menu; if necessary, correct in the Slic3r software (Filament settings).	Knowledgebase Slic3r manual
P4	Printed circular structures (holes, cylinders) are deformed and out of round.	Backlash in the X- and/or Y-axis.	✔ Calibrate backlash.	Service guide
			✔ Check timing belt tension.	Service guide
			✔ 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
P6	Gaps between extruded strands. Loose, open-stranded 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 Tips&Tricks Slic3r manual
P7	Filament bends and twists between drive gear and hot-end inlet, the filament is not conveyed to the nozzle.	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	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. Print fails for no obvious reason and with varying effects (clogging of the nozzle, grinding of the drive gear, insufficient layer binding etc.)	STL-file corrupted	✔ Check the STL-file for holes, intersections, misaligned edges and the like. Repair or redesign if necessary.	Tips&Tricks Slic3r manual netfabb manual
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.	Service guide order spare parts
P10	Visible drop formation (blobs) on external perimeters.	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 *minimum detail resolution* of the Slic3r software.	Service guide Slic3r manual
		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

No.	Symptom	Possible cause(s)	To do	Additional information
M3	Homing the X-axis leads to extruder head collision and blackout of the controls.	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.	
		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
M4	Although the left extruder has been selected as reference during leveling, the print head moves the right extruder into the center position.	Extruder offset in the web interface has been set incorrect or for the false extruder (e.g. after an update).	✔ Check in the *Setup* tab of the web-interface for the following: Extr.1 X-offset [steps] set to `0` Extr.1 Y-offset [steps] set to `0` Extr.2 X-offset [steps] set to `2078` Extr.2 Y-offset [steps] set to `-21` Regard that these are factory presets. Run the [Extruder Offset Calibration] wizard to adjust these for your specific 3D printer.	Upgrade information
M5	Filament uncoils from the spool (especially when using new 2.3 kg spools).	The spool rim is too narrow for the amount of material on new spools. The material's elasticity is due to the manufacturing process and will cause the filament to uncoil when not under tension.	✔ Print three to four of the *filament spool wings* provided at the GitHub repository and fasten them to the outside of the spool's rim. If required, apply a small amount of hot glue.	GitHub 
M6	Noticeable amount of gas bubbles in the cooling system.	Lack of coolant due to leakage.	✔ Refill coolant.	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. Inside the electronics chamber, the block of three LEDs on the BeagleBone Black is solid blue (no flashing).	The operating system for the BeagleBone Black embedded computer could not be loaded from its SD card.	✔ 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.	
			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. Timestamps of log entries are reset at re-start.	Printer is connected to a local network that does not provide internet access (no gateway available). LAN network is firewall protected. 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)	✔ Check your network's firewall and internet settings → free internet access must be provided for NTP synchronisation through port 123/UDP	
			✔ re-configure the printer to fetch a time signal from an in-house NTP-server if available	Tips&Tricks
E4	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
		URL spelling mistakes	✔ Check for correct spelling of the URL.	Software manual
		Network does not provide DHCP.	✔ Ask your system administrator for help.	
		Printer and PC are not connected to the same network.		

No.	Symptom	Possible cause(s)	To do	Additional information
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.	✔ Try using another PC and/or another internet browser. ✔ Confer with your system administrator regarding: - unblocked protocols/ports - use of static or dynamic IP-adress - firewall and/or network restrictions - network proxy-server configuration	
E6	After starting the 3D printer, the touchscreen stays completely black, the background lighting is **off**. The light ring of the wake button is illuminated. Communication via the web interface functions normally.	Defective HDMI port of the BeagleBone black.	✔ The BeagleBone black must be replaced.	Contact the sales team for a quote on the spare part or an in-house repair.
E7	The HMI does not react to user input.	Undervoltage of the USB port of the BeagleBone Black due to defective cable harness.	✔ Exchange of the cable harness.	Contact the sales team for ordering the spare part.

Slicing, CAD-files

No.	Symptom	Possible cause(s)	To do	Additional information
S1	Profile names are not readable in Slic3r drop-down menus.	Incompatibility of Slic3r (v1.1.7) and Windows operating software.	✔ Rename profiles with shorter description. ✔ Upgrade to higher version of Slic3r.	Tips&Tricks Slic3r
S2	Crashing of Slic3r with STL-file.	STL-file corrupted see P8 also	✔ Check the STL-file for holes, intersections, misaligned edges and the like. Repair or redesign if necessary.	Tips&Tricks

[1]) 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. All heating elements are switched off. Extrusion may stop mid-print.	✔ 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. see P9 also	Limit values are: 0 ... 300 °C Service guide Request a quote for the fully assembled replacement part via sales@kuehlingkuehling.de