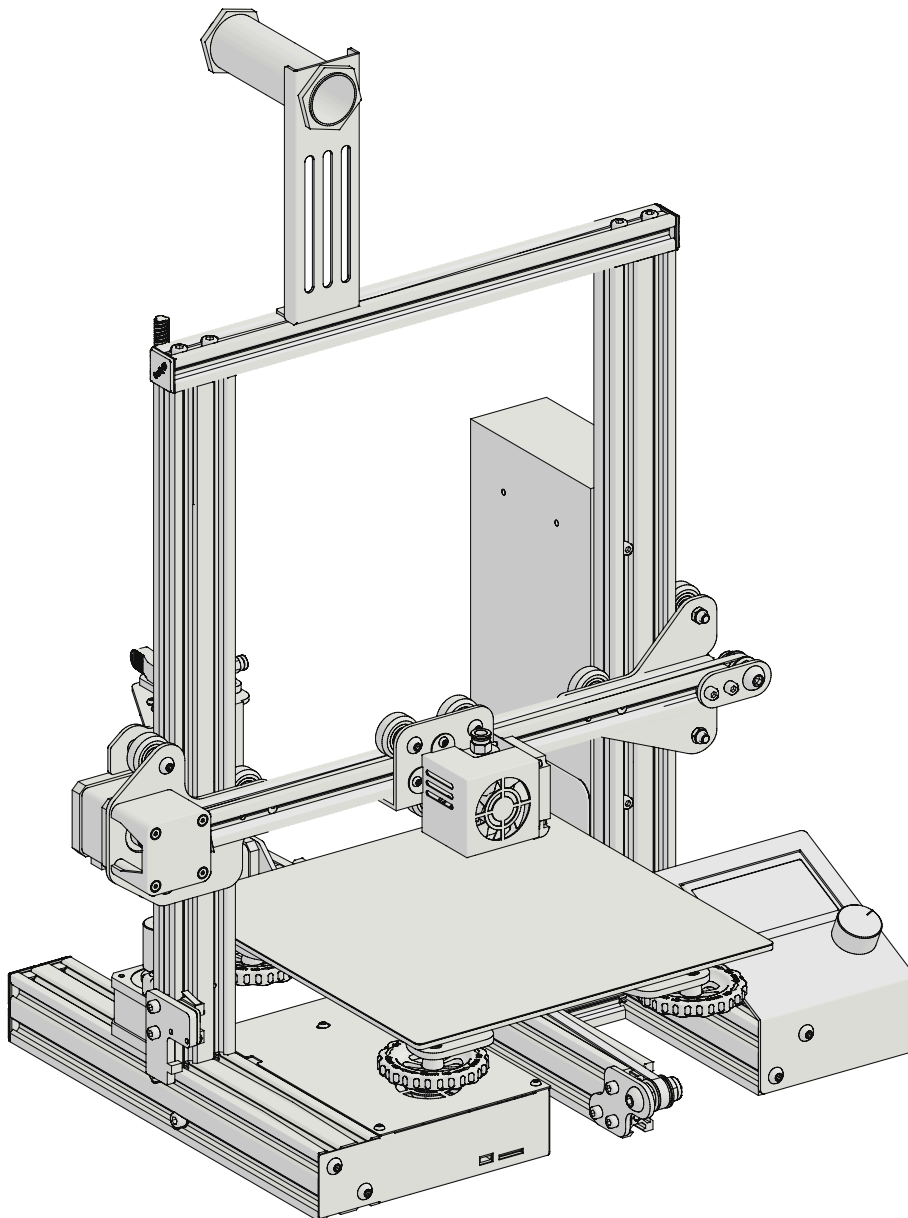


User and maintenance manual

Creality Ender-3 desktop 3D printer (FFF)



Mains-powered machine with heated parts and moving axes. Read this manual before installation, use and maintenance. Keep it with the printer and pass it on with it.



DOCUMENT
FA-E3-UMM-EN

REVISION
A · 2026-10-28

PRODUCT
Ender-3 (2018 design)

ISSUER
First Angle

Independent example prepared by First Angle from the open-source Ender-3 design published by Creality under GPL-3.0. Not issued by, affiliated with or endorsed by Creality. See page 2.

Document identification

Field	Entry
Title	User and maintenance manual, Creality Ender-3
Document number	FA-E3-UMM-EN
Revision and date	A, 2026-10-28
Language	English (original instructions)
Product	Creality Ender-3, desktop 3D printer for fused filament fabrication, original 2018 design
Product manufacturer	Shenzhen Creality 3D Technology Co., Ltd., Shenzhen, Guangdong, China ^{ASM}
Issuer of this document	First Angle, www.firstangle.ai , rihard@firstangle.ai
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Related document	Illustrated spare parts catalogue FA-E3-SPC-EN, revision A

Revision history

Rev.	Date	Description of change	Prepared by
A	2026-10-28	First issue. Generated from the Creality Ender-3 CAD assembly, bill of materials, part drawings, firmware configuration and Creality user information listed in Appendix C.	First Angle

Attribution and licence

Source design. The Ender-3 3D CAD model, bill of materials, part drawings and firmware used for this manual are published by Shenzhen Creality 3D Technology Co., Ltd. in the repository github.com/Creality3DPrinting/Ender-3 (commit 88c7758) under the GNU General Public License, version 3 (GPL-3.0). All drawings in this manual are generated from that CAD model.

Independent example. First Angle prepared this manual as an independent example. It is not affiliated with, issued by or endorsed by Creality. Creality and Ender are names of their owner and are used here only to identify the product.

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No warranty. The information is given in good faith from the sources in Appendix C. It does not replace the manufacturer's own declaration of conformity, rating plate or instructions supplied with a specific printer.

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1 About this manual

1.1 Scope and validity

This manual applies to the Creality Ender-3 desktop 3D printer in its original 2018 design: a kit printer with an open aluminium frame, a 24 V power supply unit with a 115 / 230 V selector, a mainboard with an ATmega1284P microcontroller and a 128 × 64 graphic display with a rotary control knob. It covers transport, installation, commissioning, operation, maintenance, troubleshooting, decommissioning and disposal.

The manual does not apply to later models with similar names (for example Ender-3 Pro, Ender-3 V2, Ender-3 S1, Ender-3 V3), to printers modified with parts other than those listed in the spare parts catalogue FA-E3-SPC-EN, or to firmware other than the Creality firmware listed in 3.5.

Table 1-1 Product identification

Characteristic	Entry	Source
Product	Desktop 3D printer, fused filament fabrication	CAD, LS
Model	Creality Ender-3	CAD, BOM
Design status	CAD assembly exported 2018-08-17 (SolidWorks 2018)	CAD
Firmware	Marlin 1.1.6.1 (Creality build 2018-11-28)	FW
Serial number	On the serial number label of the printer (the BOM lists a numbered label, 60 × 10.4 mm)	BOM
Electrical ratings	On the rating label of the printer (the BOM lists a specification label, 65 × 40 mm)	BOM

1.2 Target groups and qualification

The tasks in this manual are assigned to three target groups. Only persons of the stated group may carry out a task.

Table 1-2 Target groups

Target group	Qualification	Tasks
Operator	Adult who has read chapters 1 to 2 and the chapter of the task. Trained on the printer by a person familiar with it.	Commissioning checks, levelling, loading filament, operation, cleaning, simple faults (chapters 6, 7, 8.4, 9)
Maintenance person	Operator with practical mechanical skills and experience with hand tools.	Assembly of the kit, adjustments and replacement of wear parts (chapters 5.2, 8)
Qualified electrician	Person with electrical training and experience to recognise and avoid electrical hazards, as defined by national rules.	Work on the power supply unit and mains wiring, replacement of electrical components on the mains side

WARNING



Mains voltage inside the power supply unit.

Contact with live parts causes electric shock, serious injury or death.

- Do not open the power supply unit. Only a qualified electrician may work on the mains side.
- Before any work on the electrical system, switch off the printer and disconnect the mains plug.

1.3 Safety messages and signal words

Safety messages are placed before the step or chapter they apply to. Each message names the hazard and its source, the possible consequence, and the measures to avoid it. The signal word shows the level of risk.

Table 1-3 Signal words

Signal word	Meaning
DANGER	Hazard with a high level of risk. If not avoided, it will result in death or serious injury.
WARNING	Hazard with a medium level of risk. If not avoided, it can result in death or serious injury.
CAUTION	Hazard with a low level of risk. If not avoided, it can result in minor or moderate injury.
NOTICE	Information about possible damage to the printer or property. No risk of injury.
NOTE	Useful information. No hazard.

The manual contains no DANGER messages: the risk assessment of the issuer found no hazard of that level in intended use and reasonably foreseeable misuse.

1.4 Symbols and conventions

Table 1-4 Safety signs used in this manual (ISO 7010)

Sign	Code	Meaning
	W001	General warning
	W012	Electricity
	W017	Hot surface
	W024	Crushing of hands (moving parts)
	W021	Flammable material, fire

Table 1-5 Text conventions

Convention	Meaning
Prepare > Auto home	Menu path on the display: select the items one after the other with the control knob.
1	Action step. Do the steps in the order given.
Result:	State of the printer after the steps.
Sheet 50B, item 4	Reference to the spare parts catalogue FA-E3-SPC-EN: exploded view sheet and item number.
FW	Source reference. The sources are listed in Appendix C. D means derived from the CAD model; E means recommendation of the issuer.

1.5 Terms and abbreviations

Table 1-6 Terms and abbreviations

Term	Meaning
Bowden tube	PTFE tube that guides the filament from the extruder to the hot end.
Eccentric nut	Nut with an off-centre bore on which a V-wheel turns. Turning it moves the wheel towards or away from the profile and sets the preload.
Extruder	Motor-driven feeder on the left of the gantry that pushes the filament into the Bowden tube.
FFF	Fused filament fabrication: a thermoplastic filament is melted and deposited layer by layer.
Gantry	X axis assembly (X beam, gantry plates, print head) that moves up and down on the uprights.
Hot end	Heat sink, heat break, heater block, heater cartridge, thermistor and nozzle.
Levelling	Adjustment of the bed so that the nozzle has the same small gap to the print surface at every point.
microSD (TF) card	Memory card that holds the print files. The display calls it TF card.
PSU	Power supply unit: converts the mains voltage to 24 V DC.
PTFE	Polytetrafluoroethylene, the material of the Bowden tube.
V-wheel	POM wheel with a V-shaped running surface that rolls in the groove of an aluminium profile.

1.6 Related documents

Table 1-7 Related documents

Document	Content	Source
Illustrated spare parts catalogue FA-E3-SPC-EN	Exploded views, part numbers, wear parts	First Angle
Ender 3 3D Printer Instructions for assembly	Assembly of the kit in 12 steps	ASM
Ender 3 Series Quick Start Guide V1.0	Menu, loading filament, levelling, slicing	QSG
Creality firmware 1.1.6.1 for the Ender-3	Source code and configuration of the printer firmware	FW

2 Safety

2.1 Intended use

The Ender-3 is intended for producing three-dimensional objects from thermoplastic filament of 1.75 mm diameter by fused filament fabrication, within a build volume of 220 × 220 × 250 mm^{CG,LS}. Recommended materials are PLA and TPU; ABS is not recommended by Creality (it needs a constant high-temperature environment)^{CG}.

Intended use includes:

- use indoors, in a dry, well-ventilated room, on a stable, level and non-combustible surface (see 5.1);
- operation by the target groups in 1.2, with the information in this manual;
- use with the supplied mains cable on an earthed socket outlet with the mains voltage selected on the PSU;
- maintenance at the intervals in 8.2 and use of spare parts from the catalogue FA-E3-SPC-EN.

The printer is equipment for home, school, office and workshop use. It is not a toy.

2.2 Reasonably foreseeable misuse

The following uses are not permitted. They are known or foreseeable ways of using printers of this type that can cause injury, fire or damage:

- leaving the printer printing without anyone able to react, for example overnight or while away from the building;
- placing the printer on or near flammable material (paper, curtains, wood shelves, foam) or in a closed cupboard without ventilation;
- operating at the wrong mains voltage setting, with a damaged cable, an unearthed socket outlet or an extension reel that is still coiled;
- touching the nozzle, heater block or bed while hot, or removing prints from the bed before it has cooled;
- reaching into the working area while the axes move, wearing loose clothing, long open hair or jewellery near belts and pulleys;
- printing materials that need temperatures above the limits in 3.5, or materials that release hazardous substances (for example filled or flame-retardant filaments) without the extraction their supplier specifies;
- printing parts intended for food contact, medical use or load-bearing safety functions;
- use by children without supervision, or by persons who have not read this manual;
- modifying the electrical system, the firmware safety functions or the hot end without the competence to assess the consequences.

2.3 Residual risks

The design cannot remove the following risks completely. The table names where they occur and the measures that keep them low.

Table 2-1 Residual risks

Hazard	Where and when	Possible consequence	Measure (section)
Electric shock	Inside the PSU and at the mains inlet; when covers are open or cables are damaged	Death or serious injury	Keep covers closed, check cables, unplug before work (2.4.1, 8.13.1)
Hot surfaces	Nozzle and heater block up to 250 °C, bed up to 110 °C; during printing and for some time after	Burns	Do not touch, wait to cool, use gloves for hot work (2.4.2)

Hazard	Where and when	Possible consequence	Measure (section)
Moving parts	Belts, pulleys, V-wheels, gantry and bed; whenever the motors are powered	Crushing or pinching of fingers, entanglement of hair	Keep hands out, tie back hair, no loose clothing (2.4.3)
Fire	Hot end, heated bed, power connectors; in particular during unattended printing or with damaged wiring	Fire, damage to property	Supervise printing, non-combustible surface, check wiring (2.4.4)
Fumes and particles	Molten filament releases ultrafine particles and volatile organic compounds	Irritation of airways and eyes	Ventilate the room, avoid staying close to the printer (2.4.5)
Sharp edges and tools	Spatula, cutter, nozzle needle, edges of prints	Cuts	Push the spatula away from the body (7.5)

2.4 Safety instructions

2.4.1 Electrical hazards

WARNING



Electric shock from mains voltage.

The PSU and the mains inlet carry mains voltage when the printer is plugged in, also with the switch off.

- Set the voltage selector on the PSU to the local mains voltage before the first connection (5.3).
- Use only the supplied mains cable and an earthed socket outlet. The QSG requires a grounded three-prong outlet. ^{QSG}
- Do not operate the printer with damaged cables, connectors or covers. Have damage repaired by a qualified electrician.
- Disconnect the mains plug before cleaning, maintenance or any work on the electrical system.

2.4.2 Hot surfaces

WARNING



Burns from the hot end and the heated bed.

The nozzle reaches up to 250 °C ^{CG} and the bed up to 110 °C ^{CG}. They stay hot for some time after printing.

- Do not touch the nozzle, heater block or bed during printing or before the displayed temperature has dropped below 40 °C. ^E
- Remove filament residue from the nozzle only with the supplied tools and heat-resistant gloves.
- Keep children away from the printer during and after printing.

2.4.3 Moving parts

⚠ CAUTION



Crushing and pinching at belts, pulleys, V-wheels, the gantry and the bed.

The axes start to move without warning when a print starts or a menu command runs. The frame is open and has no guards.

- Keep hands out of the working area while the motors are powered.
- Do not wear gloves, loose clothing or jewellery near moving parts; tie back long hair.^{QSG}
- Before reaching into the machine, stop the print and select **Prepare > Disable steppers**.

2.4.4 Fire

⚠ WARNING



Fire from the heaters or from overheated electrical connections.

A heater that keeps heating after a fault, or a damaged cable at a moving part, can ignite the printer or its surroundings.

- Do not leave the printer printing unattended. Stay within reach so that you can switch it off.
- Place the printer on a non-combustible surface, at least 0.5 m away from flammable material.^E
- Do not disable the firmware thermal protection (2.5).
- Check the heated-bed cable and the power connectors at the intervals in 8.2.
- Keep a fire extinguisher suitable for electrical fires (CO₂ or powder) in the room.^E

2.4.5 Fumes and particles

⚠ CAUTION



Ultrafine particles and volatile organic compounds from molten filament.

Breathing the emissions over a long time can irritate the airways and eyes. The amount depends on the material and temperature.

- Use the printer in a ventilated room; do not print in bedrooms or small closed rooms.
- Follow the safety data sheet of the filament supplier for temperature and ventilation.
- Do not overheat filament above the temperature range of its supplier.

2.4.6 Children and vulnerable persons

Children under 10 years must not use the printer without supervision^{QSG}. Creality recommends supervision of children and elderly users to avoid burns^{CG}.

2.5 Built-in safety functions

The firmware supplied by Creality contains the following safety functions. Do not change or disable them.

Table 2-2 Safety functions of the firmware

Function	Behaviour	Setting	Source
Thermal runaway protection, hot end	Switches off all heaters and stops the printer if the temperature falls away from the target while heating should hold it	40 s, hysteresis 4 °C; heating watch 20 s / 2 °C	FW

Function	Behaviour	Setting	Source
Thermal runaway protection, bed	As above, for the heated bed	20 s, hysteresis 2 °C; heating watch 60 s / 2 °C	FW
Maximum temperature cut-off	Stops heating and shows Err: MAXTEMP above the limit	hot end 275 °C, bed 125 °C	FW
Minimum temperature check	Stops heating and shows Err: MINTEMP if a thermistor reads below the limit (disconnected or broken sensor)	5 °C	FW
Cold extrusion prevention	Blocks the extruder motor below the minimum temperature	170 °C	FW
Stepper timeout	Switches off the motor current after inactivity	120 s	FW
Limit switches	Define the home position of X, Y and Z	3 limit switches	BOM

2.6 Personal protective equipment

Table 2-3 Personal protective equipment

Task	Equipment
Nozzle replacement, cleaning the hot end while hot	Heat-resistant gloves
Cutting filament, removing support material, using the spatula	Safety glasses; cut-resistant gloves when removing sharp prints
Cleaning with isopropyl alcohol	Chemical-resistant gloves; no ignition sources nearby

2.7 Labels on the printer

The Creality bill of materials lists a label for the fan shroud, a rating (specification) label of 65 × 40 mm and a serial number label of 60 × 10.4 mm^{BOM}. Keep the labels clean and legible. Replace a damaged label before the printer is used again.

2.8 Emergency

- **Smoke, burning smell or fire:** switch the printer off at the mains switch and pull the mains plug if it is safe to do so. Fight a small fire only with an extinguisher suitable for electrical equipment. Do not use water on the energised printer. Call the fire brigade if the fire does not go out at once.
- **Burns:** cool the burn under running cool water for at least 10 minutes; get medical help for large or deep burns.
- **Electric shock:** do not touch the person while they may still be in contact with live parts; switch off the supply first, then give first aid and call emergency services.
- **Fingers or hair caught:** switch the printer off at the mains switch; the motors then lose their holding force and the axes can be moved by hand.

3 Product description

3.1 Overview

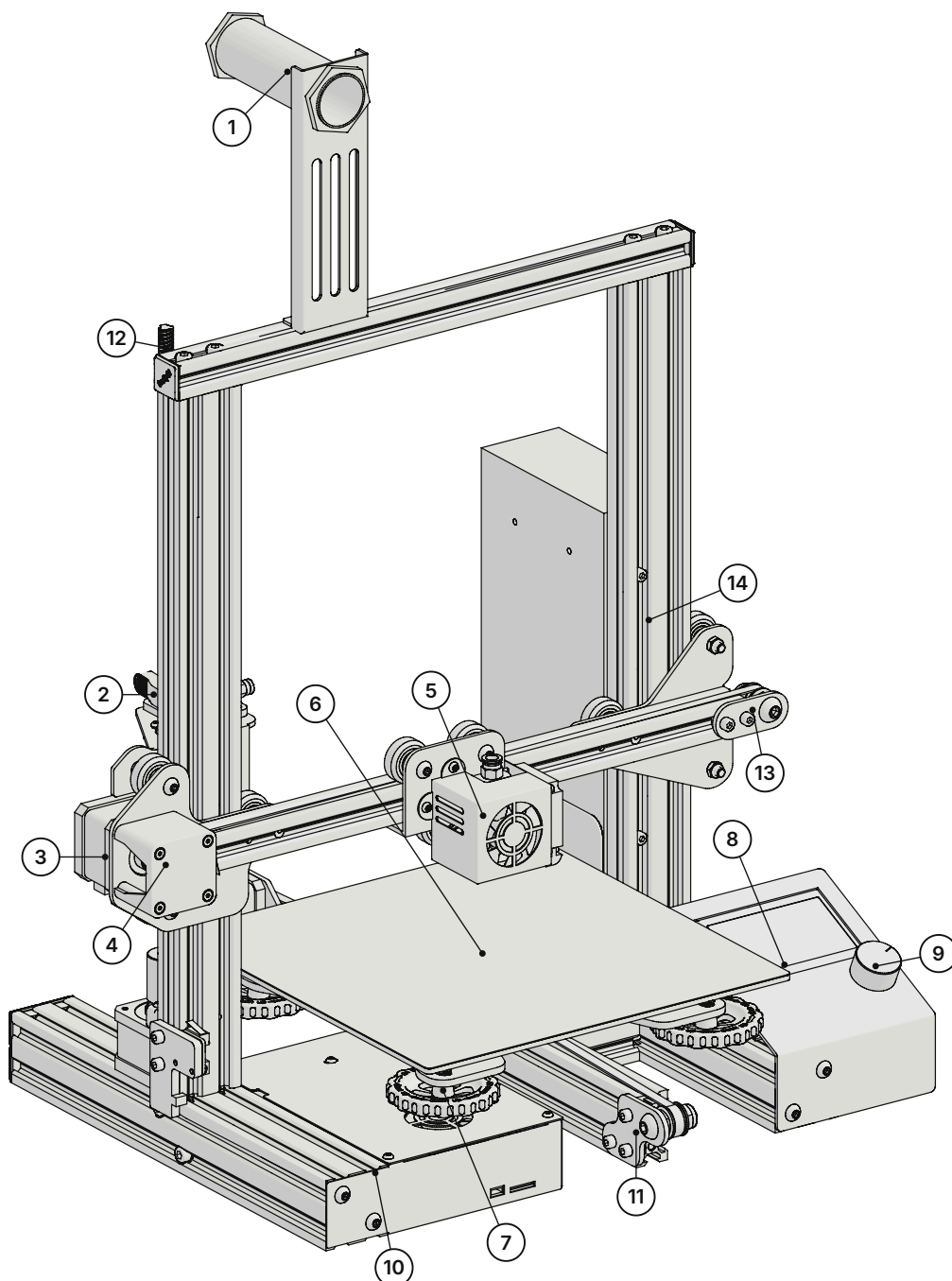


Figure 3-1 Overview, front left. Line drawing generated from the Creality CAD assembly.

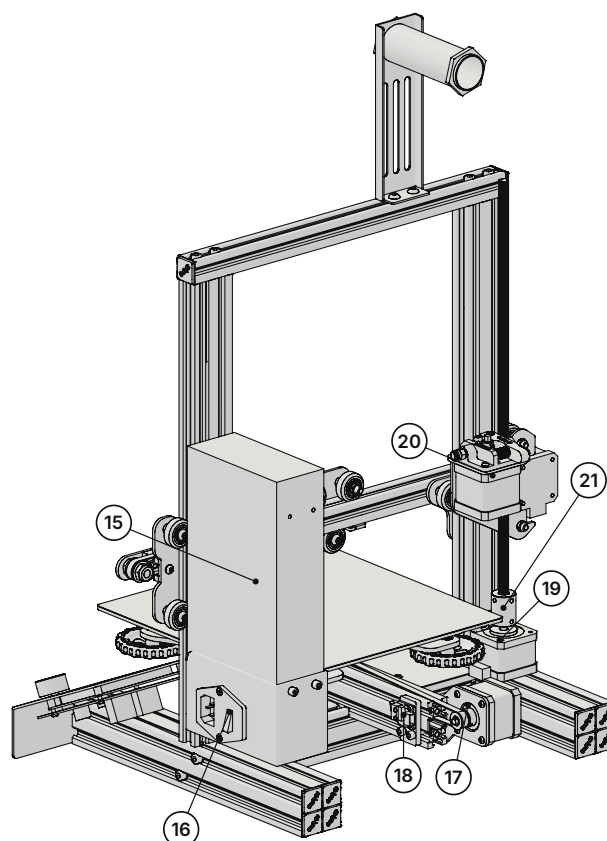


Figure 3-2 Overview, rear right.

Table 3-1 Main components (numbers as in the two overview figures)

No.	Component	Function
1	Spool holder	Carries the filament spool on top of the frame
2	Extruder with idler lever	Feeds the filament into the Bowden tube; press the lever to load or unload filament
3	X motor	Drives the print head along the X beam through the X belt
4	X limit switch	Home position of the X axis
5	Print head	Carriage with hot end, hot end cooling fan, part cooling fan and duct
6	Print surface sheet on heated bed	Surface on which the object is built; heated up to the bed temperature
7	Bed levelling knobs (4)	Set the height of the bed corners
8	Display	Shows temperatures, position, progress and the menu
9	Control knob	Turn to select, push to confirm
10	Electronics enclosure	Mainboard with microSD (TF) card slot and USB port
11	Y belt tensioner	Sets the tension of the Y belt
12	Z lead screw	Moves the gantry up and down
13	X belt tensioner	Sets the tension of the X belt

No.	Component	Function
14	Uprights (frame)	Vertical aluminium profiles that guide the gantry
15	Power supply unit (PSU)	Converts mains voltage to 24 V DC; carries the 115 / 230 V selector
16	Mains inlet and switch	Connection of the mains cable and main switch
17	Y motor	Drives the bed through the Y belt
18	Y limit switch	Home position of the Y axis
19	Z motor	Turns the lead screw
20	Extruder motor	Drives the extruder gear
21	Shaft coupling	Connects the Z motor to the lead screw

The Z limit switch sits on the left upright, about 32 mm above the base, and is hidden by the upright in the overview figures; see Figure 8-6.

3.2 How the printer works

The Ender-3 is a Cartesian printer. The print head moves left and right (X) along the X beam, the bed moves forward and backward (Y) on the Y rail, and the whole gantry moves up and down (Z) on the two uprights, driven by a single lead screw on the left. All axes run on POM V-wheels in the grooves of the aluminium profiles^{DWG}. The extruder on the left of the gantry pushes the filament through a PTFE tube (Bowden tube) to the hot end, where it melts and leaves the nozzle^{BOM}.

The mainboard reads the print file (G-code) from the microSD card or receives it over USB, controls the four stepper motors and keeps the nozzle and bed at their set temperatures. The 24 V PSU supplies the mainboard, the heaters, the motors and the fans.

3.3 Operating and display elements

Table 3-2 Operating and display elements

Element	Location	Use
Mains switch	On the mains inlet module at the PSU, right side at the rear	Switches the printer on and off
Voltage selector 115 V / 230 V	On the PSU	Set once before first use to the local mains voltage ^{ASM}
Display	Front right	Status screen and menu
Control knob	Next to the display	Turn: change option or value. Push: confirm or open a sub-menu ^{QSG}
microSD (TF) card slot and USB port	Front of the electronics enclosure	Print files; computer connection
Idler lever	On the extruder	Press to release the filament grip
Levelling knobs	Under the four corners of the bed	Adjust the height of each corner

3.4 Display and menu

The status screen shows the set and actual temperatures of nozzle and bed, the part cooling fan speed, the position of the axes, the print speed, the print time, the progress and a message line^{QSG}. Push the knob to open the menu. The main menu items of the firmware are^{FW}:

Table 3-3 Main menu (firmware 1.1.6.1)

Menu item	Sub-items used in this manual
Prepare	Auto home, Disable steppers, Preheat PLA, Preheat ABS, Cooldown, Move axis
Control	Temperature, Motion, Store settings, Load settings, Restore failsafe
Print from TF	List of files on the card; shows No TF card when no card is inserted
Tune (during a print)	Speed, temperatures, fan, Change filament
Pause print, Resume print, Stop print	Control of a running print

3.5 Technical data

Table 3-4 General

Characteristic	Value	Source
Process	Fused filament fabrication (FFF, also called FDM)	LS
Build volume (X × Y × Z)	220 × 220 × 250 mm	CG, LS
Bed size and Z travel in the firmware	235 × 235 mm, Z max 250 mm	FW
Overall dimensions (W × D × H), manufacturer	440 × 410 × 465 mm	LS
Overall dimensions (W × D × H), from CAD	440 × 415 × 466 mm; 611 mm high with the spool holder	D
Weight	8 kg	LS
Frame	Aluminium profiles 20 × 20, 20 × 40 and 40 × 40 mm, black anodised	BOM, DWG
Firmware	Marlin 1.1.6.1 (Creality build 2018-11-28)	FW
Print files	G-code on the card; STL and OBJ models are sliced on a computer first	LS, QSG
Storage media	microSD (TF) card; 8 GB card and card reader supplied	FW, BOM
Computer connection	USB, 115200 baud	QSG, FW

Table 3-5 Electrical data

Characteristic	Value	Source
Mains supply	115 V AC or 230 V AC, selected on the power supply unit, 50/60 Hz	ASM, CG, LS
Rated power	270 W	CG
Power supply unit, output	24 V DC, 15 A (360 W)	BOM, LS
Heated bed	24 V, 220 W, 235 × 235 mm	BOM
Hot end heater	24 V, 40 W, cartridge ø 6 × 20 mm	BOM
Temperature sensors	NTC 100 kΩ (firmware sensor type 1)	BOM, FW
Fans	3 × 24 V DC, 40 × 40 × 10 mm (hot end, part cooling, mainboard)	BOM
Mainboard	Controller with ATmega1284P microcontroller	BOM, FW

Characteristic	Value	Source
Mains switch	Rocker switch in the mains inlet, 10 A; switches the power supply unit on and off	BOM
Low-power modes	None. No standby or networked standby mode; off only with the mains switch	FW, BOM

Table 3-6 Temperatures

Characteristic	Value	Source
Nozzle temperature, maximum in use	up to 250 °C	CG
Nozzle temperature, launch specification	255 °C	LS
Nozzle cut-off temperature (firmware)	275 °C	FW
Bed temperature, maximum in use	up to 110 °C	CG, LS
Bed cut-off temperature (firmware)	125 °C	FW
Preset Preheat PLA	nozzle 185 °C, bed 45 °C	FW
Preset Preheat ABS	nozzle 240 °C, bed 70 °C	FW
Minimum extrusion temperature	170 °C	FW

Table 3-7 Motion system

Characteristic	Value	Source
Drives	4 × stepper motor NEMA 17: 3 × JK42HS34-0844YA-03F (X, Y, Z), 1 × JK42HS40-1004AC-01F (extruder)	BOM
X and Y drive	GT2 timing belt, 6 mm wide, on 20-tooth pulleys (X belt L 786 mm, Y belt L 743 mm)	BOM
Z drive	Single lead screw T8, lead 8 mm, stainless steel, brass nut	BOM, DWG
Guides	POM V-wheels on 625ZZ ball bearings, preload set by eccentric nuts	DWG, BOM
Resolution (firmware)	X 80.00, Y 80.00, Z 400.00, E 93.00 steps/mm	FW
Maximum feed rates (firmware)	X 500, Y 500, Z 5, E 25 mm/s	FW
Maximum accelerations (firmware)	X 500, Y 500, Z 100, E 1000 mm/s ²	FW
Recommended print speed	50 to 60 mm/s	CG
Maximum print speed, launch specification	180 mm/s	LS

Table 3-8 Printing

Characteristic	Value	Source
Nozzle	0.4 mm, brass, thread M6	DWG, BOM
Other nozzle sizes	0.2, 0.6 and 0.8 mm (optional)	CG
Filament diameter	1.75 mm	QSG, CG
Materials	PLA and TPU; ABS is not recommended by Creality (it needs a constant high-temperature environment)	CG
Extruder	Bowden extruder, PTFE tube OD 4 mm / ID 2 mm, L 400 mm	BOM

Characteristic	Value	Source
Layer thickness	0.1 to 0.4 mm	LS
Printing accuracy, launch specification	±0.1 mm	LS

Table 3-9 Ambient conditions

Characteristic	Value	Source
Place of use	Indoors, dry, low-dust, well ventilated, away from heat sources	QSG
Ambient temperature in use	15 to 30 °C, without draughts on the print	E
Storage and transport	-10 to 40 °C, dry, in the original packaging	E

E: ambient limits recommended by the issuer for an open-frame FFF printer with a 24 V PSU.

3.6 Dimensions and space requirements

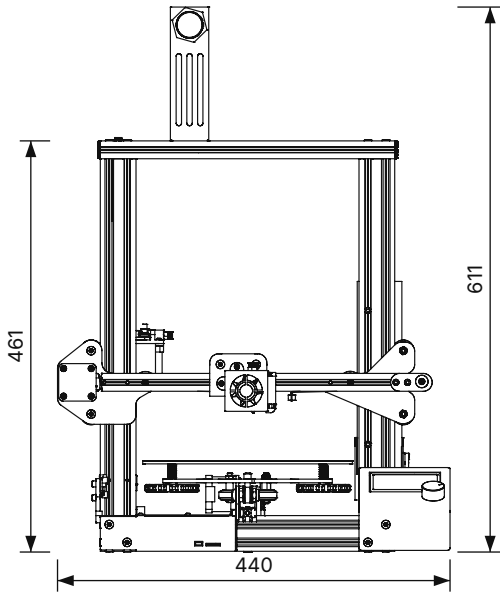


Figure 3-3 Front view, dimensions in mm (from CAD).

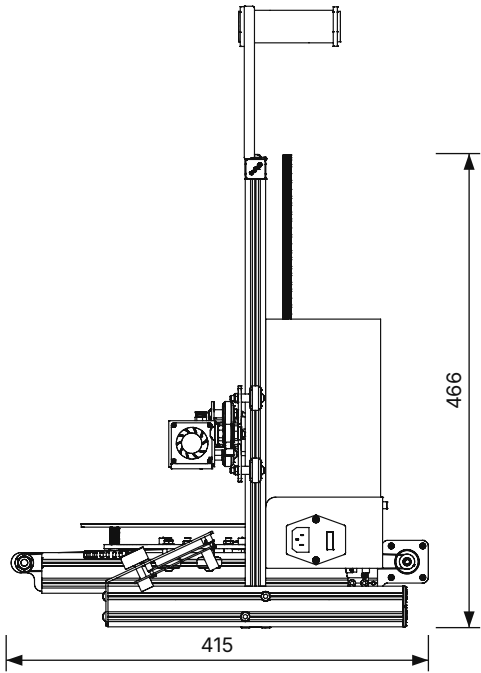


Figure 3-4 Right side view, dimensions in mm (from CAD).

The bed travels 220 mm forward and backward. Keep at least 100 mm free in front of and behind the frame for the bed, and 100 mm on both sides for air circulation and access to the knob, switch and card slot^E. The overall dimensions with the bed in the modelled position are 440 × 415 × 466 mm^D; Creality states 440 × 410 × 465 mm^{LS}.

4 Transport, storage and unpacking

4.1 Transport

The printer is delivered as a kit in a carton of 510 × 400 × 190 mm^{BOM}. The net weight of the printer is 8 kg^{LS}.

- Transport the printer in its original packaging whenever possible.
- Switch off, unplug and let the printer cool before moving it. Remove the filament and the spool.
- Lift an assembled printer by the base frame with both hands. Do not lift it by the gantry, the bed, the spool holder or the display.
- After transport, check the frame screws, the eccentric nuts and the levelling (8.6, 6.2).

4.2 Storage

Store the printer in a dry, dust-free room within the storage conditions in 3.5. Store filament in a closed bag with desiccant: many filaments absorb moisture, which degrades print quality.

4.3 Scope of delivery

The Creality bill of materials lists the following items in the shipping carton^{BOM}. Check the delivery against the list.

Table 4-1 Scope of delivery

Item	Quantity
Printer	
Pre-assembled base with Y axis, bed and electronics; frame parts, gantry, extruder, PSU, display and spool holder as assembly groups (see the Creality assembly instructions)	1 set
Tools	
Hexagon socket keys 1.5, 2, 2.5, 3 and 4 mm	1 each
Open-ended spanners 6 mm and 8 / 10 mm	1 each
Screwdriver	1
Spatula for removing prints	1
Side cutter	1
Nozzle cleaning needle	1
Accessories and consumables	
Mains cable	1
microSD card 8 GB and card reader	1 each
Spare nozzle 0.4 mm (the BOM lists 2 nozzles, one fitted)	1
Test filament	5 m
Clips for the print surface sheet	4
Cable ties 4 × 150 mm	10
Spare screws, nuts and T-slot nuts in bags	1 set
Documents	
Instructions, warranty card, product qualification certificate	1 each

4.4 Unpacking and inspection

- 1 Open the carton on a clean, flat surface and take out the foam inserts with the parts.
- 2 Check all parts for transport damage: bent profiles, cracked plastic parts, damaged cables and connectors.
- 3 Do not assemble or connect a printer with damaged electrical parts. Contact the supplier.
- 4 Keep the packaging for later transport. Dispose of packaging you do not keep through the local recycling system.

5 Installation

5.1 Requirements for the place of installation

- Stable, level table that does not vibrate; the printer moves its bed quickly and vibration reduces print quality^{QSG}.
- Non-combustible surface under the printer, for example a stone or metal plate, and no flammable material within 0.5 m^E.
- Ventilated room, away from heat sources, direct sunlight and draughts^{QSG}.
- Earthed socket outlet within reach of the supplied cable; the plug must remain accessible so that the printer can be disconnected at any time.
- Free space for the bed travel and for access as described in 3.6.

5.2 Assembling the kit

The printer is supplied as a kit with the base, the Y axis, the bed and the electronics pre-assembled. Assemble the rest in the order of the pictorial Creality assembly instructions (12 steps)^{ASM}. The table lists the points of those instructions that matter for safety and function.

Table 5-1 Key points of the Creality assembly instructions

Step	Work	Source
1	Fit the two uprights to the base with 4 × M5 × 45 screws	ASM
2	Fit the power supply unit (2 × M4 × 20) and the display (2 × M5 × 8). The instructions repeat here that the input voltage must match the local mains	ASM
3	Fit the Z limit switch at about 32 mm above the base	ASM
4	Fit the Z motor and the T8 lead screw	ASM
5 to 11	Fit the gantry, the X axis parts, the belts, the top cross member and the spool holder as shown in the pictures	ASM
12	Connect the cables of the extruder (E), X and Z motors and limit switches, and the display cable	ASM

NOTICE

Damage to the electronics from wrong connections.

Plugging a motor cable into a limit switch socket or reversing connectors can damage the mainboard.

- Connect each cable to the motor or switch of the same axis, as marked on the cables.
- Route cables so that they do not rub on moving parts or touch the heated bed.

Checks after assembly

Table 5-2 Checks after assembly

Check	Requirement	Section
Frame	Uprights at right angles to the base; all frame screws tight	8.13
V-wheels	All wheels touch their profile; no play, no binding	8.6
Belts	Belts tight, teeth engaged on the pulleys	8.5
Gantry	Gantry level; moves freely by hand when the printer is off	8.6

Check	Requirement	Section
Cables	All connectors seated; no cable in the path of moving parts	8.13.1

5.3 Setting the mains voltage selector

The PSU of the Ender-3 has a selector with one position for 100 to 120 V mains and one for 200 to 240 V mains. Creality's assembly instructions call the positions 110 V and 220 V^{ASM}, its user guide 115 V and 230 V^{CG}. The selector must match the local mains voltage before the printer is switched on. The nominal mains voltage in the EU is 230 V.

WARNING



Electric shock and fire from a wrong voltage setting.

If the selector is in the 115 V position and the printer is connected to 230 V mains, the PSU can be destroyed at once and can overheat or catch fire.

- Check the selector before the first connection and after every repair of the PSU.
- Change the selector only with the mains plug disconnected.

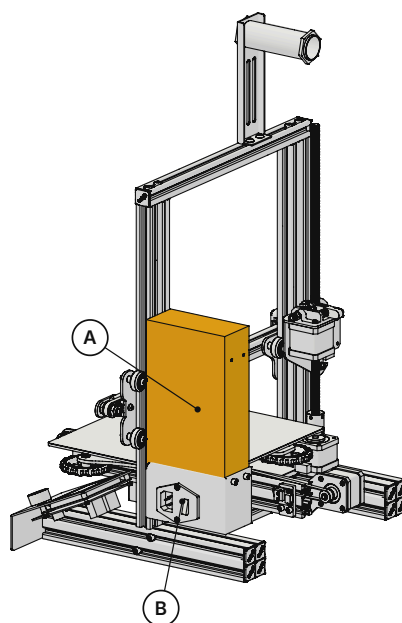


Figure 5-1 Position of the PSU (A) and the mains inlet with switch (B) at the right rear of the printer.

(A) Power supply unit (B) Mains inlet and switch

BEFORE YOU START

- Mains plug disconnected
- Small flat-blade screwdriver

- 1 Find the voltage selector on the housing of the PSU (A).
- 2 Check the position of the selector. On 230 V mains (EU) it must be in the 220 V / 230 V position.
- 3 If the position does not match the local mains voltage, slide the selector to the correct position with the screwdriver.

Result: The PSU is set to the local mains voltage.

5.4 Connecting to the mains

- 1 Check that the mains switch (B in Figure 5-1) is in the off position.
- 2 Connect the supplied mains cable to the mains inlet of the printer.
- 3 Connect the plug to an earthed socket outlet. Do not use an extension reel that is still coiled.

6 Commissioning

6.1 First switch-on

- 1 Check the assembly as in 5.2 and the voltage selector as in 5.3.
- 2 Switch on the printer at the mains switch.
- 3 Check that the display starts and shows the status screen.
- 4 Check that the hot end cooling fan at the front of the print head runs. Do not print if it does not run.
- 5 Select **Prepare > Auto home**. The axes move to their limit switches.

Result: The print head is at the front left of the bed, near the home position. The printer is ready for levelling.

NOTICE

Damage to the hot end without cooling.

If the hot end cooling fan does not run, heat rises into the heat sink and the filament jams.

- Switch off and check the fan connector before you heat the nozzle.

6.2 Levelling the bed

Level the bed before the first print, after transport, after a nozzle change and whenever the first layer does not stick evenly. Creality uses a sheet of plain A4 paper (about 0.1 mm) as gauge ^{QSG}.

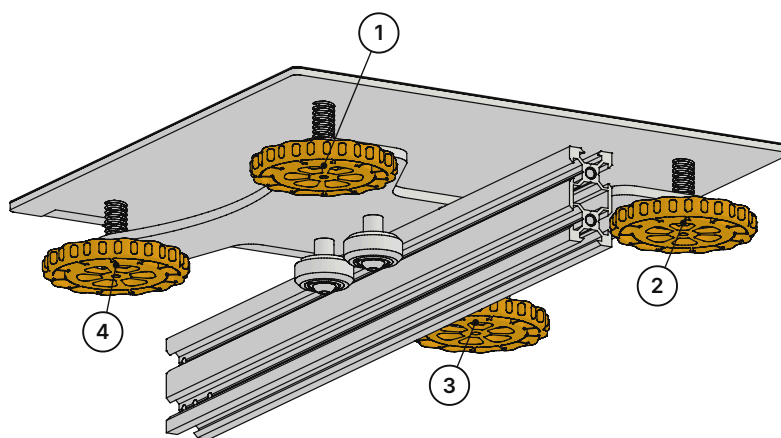


Figure 6-1 Levelling knobs under the bed, seen from below at the front, with the levelling order 1 to 4.

BEFORE YOU START

- Bed and nozzle at room temperature, or both preheated to printing temperature for a more accurate result
- Nozzle clean, without filament residue
- One sheet of plain A4 printer paper

- 1 Select **Prepare > Auto home** and wait until the print head stops.
- 2 Select **Prepare > Disable steppers**. The print head and the bed can now be moved by hand.
- 3 Move the print head and the bed by hand so that the nozzle is above the front left levelling screw (1).
- 4 Put the paper between nozzle and print surface. Turn the knob under this corner until the nozzle lightly scratches the paper when you move it.

- 5 Repeat step 4 at corners 2, 3 and 4 in this order.
- 6 Repeat the round once or twice until all four corners give the same light resistance.^{QSG}

Result: The gap between nozzle and print surface is the same at all four corners.

NOTE Turn the knob in the direction shown on the knob to raise or lower the corner. Small turns are enough: the springs under the bed hold the setting.

6.3 Loading filament

- 1 Put the filament spool on the spool holder. Cut the end of the filament at an angle with the side cutter.
- 2 Select **Prepare > Preheat PLA** (nozzle 185 °C) or the preset for your material, and wait until the nozzle reaches the set temperature^{FW}.
- 3 Press the idler lever of the extruder and push the filament through the small hole of the extruder into the Bowden tube.^{QSG}
- 4 Keep pushing until filament comes out of the nozzle. Release the lever.

Result: The extruder grips the filament. The printer is ready to print.

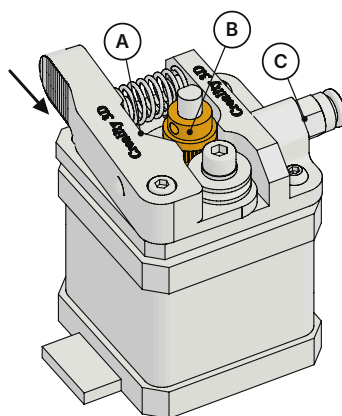


Figure 6-2 Extruder: idler lever (A), drive gear (B) and push-in fitting of the Bowden tube (C). The arrow shows where to press the lever.

(A) Idler lever (B) Drive gear (C) Push-in fitting

NOTE The extruder motor does not turn below 170 °C^{FW}. This prevents damage to the drive gear from solid filament.

6.4 Test print

- 1 Insert the microSD card with the test file into the card slot.
- 2 Select **Print from TF** and the test file. The printer heats up and starts printing.
- 3 Watch the first layer. It must be flat, slightly squeezed and stick over the whole length.
- 4 If the first layer does not stick or is too thin, stop the print and level again (6.2).

7 Operation

7.1 Before every print

Table 7-1 Checks before every print

Check	Action if not met
Print surface clean, free of residue and grease	Clean as in 8.4
Enough filament on the spool for the print	Change the spool (7.6)
Nozzle clean, no filament hanging from it	Preheat and remove residue with the supplied tools
No foreign objects in the working area or on the rails	Remove them
Cables undamaged, no smell of burning	Do not print; check as in 8.13.1
Someone stays within reach during the print	Do not start the print

7.2 Preparing print files

The printer prints G-code files from the microSD card. Prepare them on a computer with a slicing program: open the 3D model (STL or OBJ), choose the settings, and save the G-code to the card^{QSG}. Set the printer size in the slicer to 220 × 220 × 250 mm^{QSG}.

The Creality reference profile for the Ender-3 uses: layer 0.15 mm, wall 0.8 mm, infill 20 %, nozzle 200 °C, bed 45 °C, print speed 50 mm/s, travel 80 mm/s, fan 100 %^{CP}. Use it as a starting point and follow the temperature range of the filament supplier.

7.3 Starting and monitoring a print

- 1 Insert the card and select **Print from TF**, then the file.
- 2 Watch the first layer until it is complete.
- 3 Stay within reach while the printer prints. Check the print from time to time.

WARNING



Fire during unattended printing.

Faults such as a loose heater connection or a detached print can develop over hours. Nobody can react if the printer is unattended.

- Do not leave the building while the printer prints.
- Switch the printer off when the print is finished.

7.4 Adjusting, pausing and stopping a print

During a print, push the knob to open the menu. Under **Tune** you can change the print speed, temperatures and fan speed. **Pause print** interrupts the print; **Resume print** continues it. **Stop print** ends the print; it cannot be continued^{FW}.

7.5 Removing the print

⚠ CAUTION



Burns and cuts when removing prints.

The bed can be hot. The spatula and the edges of the print are sharp.

- Wait until the bed has cooled below 40 °C.^E
- Push the spatula away from your body and hands.

- 1 Wait until the bed has cooled.
- 2 Remove the clips and take off the print surface sheet, or leave the sheet in place.
- 3 Slide the spatula under the edge of the print and lift it carefully.
- 4 Refit the sheet and the clips. Make sure the sheet lies flat.

7.6 Changing filament

- 1 Preheat the nozzle to the printing temperature of the old filament.
- 2 Press the idler lever and pull the old filament out of the extruder.^{QSG}
- 3 Insert the new filament as in 6.3 until the new colour or material comes out of the nozzle.

NOTE During a print, use **Tune > Change filament**: the firmware parks the print head, unloads the filament and asks you to insert the new filament.^{FW}

7.7 After a power interruption

The Creality firmware saves the progress of a print from the card. After a power interruption the display asks **Power-Loss Recovery ?** when the printer is switched on again. Confirm to continue the print from the saved position, or decline to cancel it^{FW}. Check the print and the first new layers before you leave the printer printing.

7.8 Switching off

- 1 Wait until the print is complete or stop it.
- 2 Wait until the nozzle has cooled below 50 °C, so that the hot end cooling fan has removed the heat from the heat sink.^E
- 3 Switch off at the mains switch. Disconnect the mains plug if the printer is not used for a longer time.

8 Maintenance

8.1 Safety during maintenance

WARNING



Electric shock and unexpected movement during maintenance.

Plugged-in printers carry mains voltage in the PSU, and motors can start when a menu command or print file runs.

- Switch off and disconnect the mains plug before every task, unless the task says that the printer must be on.
- For tasks with the printer on (nozzle change, levelling), keep hands out of the axes and do not start a print.

CAUTION



Burns at the hot end and bed.

Some tasks need a hot nozzle.

- Wear heat-resistant gloves.
- Hold the heater block with a spanner, never with the fingers.

8.2 Maintenance schedule

The intervals are recommendations of the issuer. They are based on the maintenance guidance of Creality^{CG,CM} and on the published practice for comparable Cartesian printers^{PK}. Shorten them for heavy use, abrasive filaments or dusty rooms. Operating hours mean hours of printing.

Table 8-1 Maintenance schedule

Interval	Task	By	Section	Basis
Before every print	Clean the print surface; check nozzle and working area	Operator	8.4	CG, E
Weekly or every 50 h	Check belt tension (X and Y)	Operator	8.5	CG, CM, E
Weekly or every 50 h	Check the V-wheels for play; adjust the eccentric nuts	Maintenance person	8.6	CG, ASM, E
Monthly or every 200 h	Clean the extruder drive gear; check the idler lever for cracks	Maintenance person	8.9	CM, PK, E
Monthly or every 200 h	Clean the fans of the print head and the electronics enclosure	Maintenance person	8.12	CM, PK
Monthly or every 200 h	Lubricate the Z lead screw; check the shaft coupling	Maintenance person	8.11	CG, E
Monthly or every 200 h	Check the heated-bed cable, motor cables and power connectors	Maintenance person	8.13.1	PK, E
Every 3 to 6 months	Check and clean the heat break (throat); check the PTFE tube and fittings	Maintenance person	8.10	CG

Interval	Task	By	Section	Basis
Every 3 to 6 months, or when print quality drops	Replace the nozzle	Maintenance person	8.8	CG, PK, CM
Every 6 months	Check all frame screws	Maintenance person	8.13	E
After transport	Check frame, eccentric nuts, levelling	Maintenance person	8.6	E

8.3 Tools and materials

Table 8-2 Tools and materials for maintenance

Tool or material	Use	Supplied
Hexagon socket keys 1.5 to 4 mm	Screws of the frame (4 mm), belt tensioners (3 mm), fans and hot end	Yes
Open-ended spanner 6 mm	Nozzle (6 mm across flats in the CAD model) ^D	Yes
Open-ended spanner 8 / 10 mm	Eccentric nuts (10 mm across flats on the drawing) ^{DWG}	Yes
Adjustable spanner or second spanner	Holding the heater block during nozzle change	No
Isopropyl alcohol, lint-free cloth	Cleaning the print surface ^{QSG}	No
Grease for lead screws (lithium or PTFE-based)	Z lead screw ^{CG}	No
Brass brush, cleaning needle	Extruder gear and nozzle	Needle only
Compressed air in a can	Fans and electronics enclosure	No
Heat-resistant gloves	Hot end work	No

8.4 Cleaning the print surface

- 1 Let the bed cool down.
- 2 Wipe the print surface with a lint-free cloth and isopropyl alcohol^{QSG}.
- 3 Let the alcohol evaporate completely before you heat the bed.

⚠ CAUTION



Fire from alcohol vapour.

Isopropyl alcohol is flammable.

- Clean only a cold bed with the printer switched off.
- Keep the bottle closed and away from the printer during printing.

8.5 Checking and adjusting belt tension

Loose belts cause circles that are not round and lines that do not touch^{TS}. A correctly tensioned belt is tight and gives a clear tone when plucked^{CM}. Do not over-tension: the bearings of the motors and idlers wear faster.

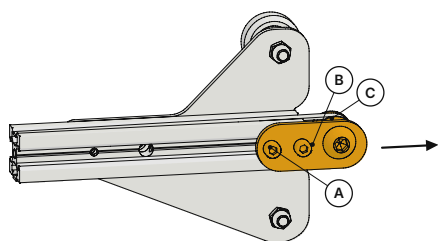


Figure 8-1 X belt tensioner at the right end of the X beam.

- (A) Locking screws (2×) (B) Tensioner bracket
(C) Idler pulley

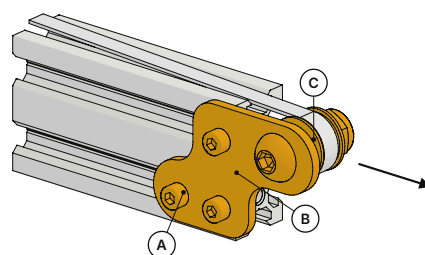


Figure 8-2 Y belt tensioner at the front of the Y rail.

- (A) Locking screws (3×) (B) Tensioner bracket
(C) Idler pulley

BEFORE YOU START

- Printer switched off and unplugged
- Hexagon socket key 3 mm for the M4 locking screws

- 1 Move the print head (X) or the bed (Y) by hand and pluck the belt in the middle of its free length. Check that it is tight and has no damaged teeth.
- 2 To tension: loosen the locking screws (A) of the tensioner bracket (B) by one turn.
- 3 Pull the tensioner bracket in the direction of the arrow, away from the motor, until the belt is tight.
- 4 Hold the bracket and tighten the locking screws.
- 5 Move the axis by hand over its full travel. It must move evenly, without jerks.

Result: The belt is tight and the axis moves evenly.

NOTE Replace a belt that has cracks, frayed edges or missing teeth. Part numbers: X belt E3-20-130 (sheet 20C, item 2), Y belt E3-30-090 (sheet 30D, item 2).

8.6 Checking and adjusting the eccentric nuts

The V-wheels must touch their profile without play and without binding. In each wheel group, one wheel (two on the bed carriage) runs on an eccentric nut that sets the preload. The printer has 5 (print head carriage 1, gantry plates 2, bed carriage 2)^D.

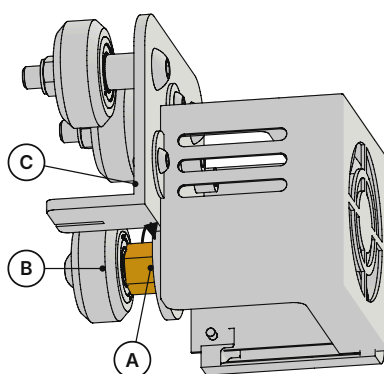


Figure 8-3 Print head carriage seen from the left and below: eccentric nut (A) between the carriage plate (C) and the lower V-wheel (B).

(A) Eccentric nut (B) V-wheel (C) Carriage plate

Table 8-3 Positions of the eccentric nuts (from CAD)

Position	Number	Wheel group
Print head carriage, lower wheel	1	3 wheels on the X beam
Left gantry plate, inner wheel	1	3 wheels on the left upright
Right gantry plate, inner wheel	1	3 wheels on the right upright
Bed carriage, wheels on one side of the Y rail	2	4 wheels on the Y rail

BEFORE YOU START

- Printer switched off and unplugged
- Open-ended spanner 10 mm

- 1 Hold the print head, the gantry or the bed and try to rock it at right angles to its direction of travel. Any play must be removed.
- 2 Turn each wheel of the group by hand. A wheel that turns freely without moving the carriage does not touch the profile.
- 3 Put the spanner on the eccentric nut and turn it in small steps until the wheel just touches the profile and turns with the carriage.
- 4 Move the carriage over its full travel. It must move smoothly without binding.^{ASM}

Result: The carriage has no play and moves smoothly.

NOTICE

Flat spots on the V-wheels.

Over-tightened eccentric nuts press flats into the POM wheels and cause vibration.

- Turn the eccentric nut only until the play is gone.

8.7 Re-levelling the bed

Level the bed as in 6.2 after transport, after a nozzle change, after work on the bed and whenever the first layer is uneven. Creality recommends re-levelling when warping occurs^{CG}.

8.8 Replacing the nozzle

Replace the nozzle when it is worn, damaged or clogged and cannot be cleared. The nozzle is a wear part: E3-50-180 (sheet 50B, item 16).

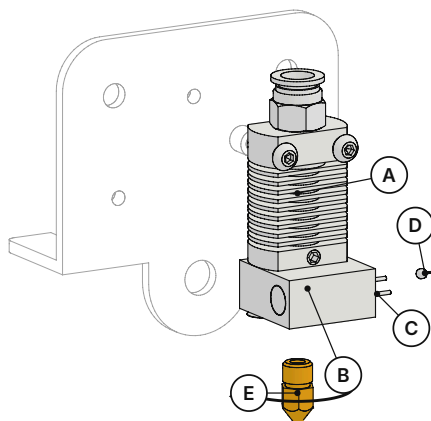


Figure 8-4 Hot end with the nozzle (E) removed from the heater block (B). The arrow shows the direction to unscrew: anticlockwise when seen from below.

(A) Heat sink (B) Heater block (C) Heater cartridge (D) Thermistor (E) Nozzle

⚠ WARNING



Burns from the hot nozzle and heater block.

The nozzle is changed at printing temperature so that the remaining plastic is soft.

- Wear heat-resistant gloves.
- Hold the heater block with a spanner. Do not touch it.

BEFORE YOU START

- Filament removed (7.6)
- Spanner 6 mm for the nozzle and a second spanner for the heater block
- New nozzle 0.4 mm, E3-50-180 (sheet 50B, item 16)

- 1 Remove the two screws of the fan shroud and fold the shroud aside without straining the fan cables^{CM}.
- 2 Heat the nozzle to 200 °C and wait until the temperature is stable.
- 3 Hold the heater block (B) with a spanner.
- 4 Unscrew the nozzle (E) anticlockwise as seen from below with the 6 mm spanner, and put it on a non-combustible surface.
- 5 Screw in the new nozzle by hand, then tighten it lightly with the spanner while you hold the heater block. Do not over-tighten: the thread is M6 in aluminium^{DWG}.
- 6 Refit the fan shroud. Let the hot end cool down.
- 7 Level the bed (6.2).

Result: The new nozzle is fitted and the bed is levelled.

8.9 Cleaning the extruder drive gear

Filament dust on the drive gear reduces the grip and causes under-extrusion. A repeated knocking noise from the extruder means that the gear slips^{CM}.

- 1 Remove the filament (7.6) and switch off the printer.
- 2 Press the idler lever (A in Figure 6-2) and look at the teeth of the drive gear (B).
- 3 Brush the teeth clean with a brass brush or the cleaning needle^{CM}.
- 4 Check the idler lever for cracks. Replace a cracked lever: E3-50-020 (sheet 50A, item 3).

8.10 Checking the PTFE tube and the push-in fittings

The PTFE tube (Bowden tube) guides the filament from the extruder to the hot end. A tube that is damaged, kinked or browned at the hot end end causes jams and must be replaced^{CM}. Creality recommends cleaning the throat (heat break) every 3 to 6 months^{CG}. PTFE tube: E3-50-210 (sheet 50B, item 27).

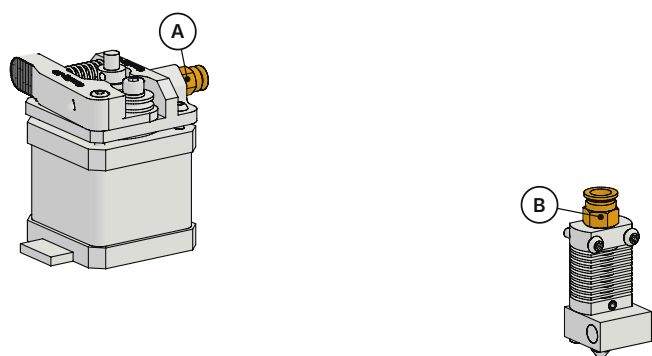


Figure 8-5 Push-in fittings of the Bowden tube at the extruder (A) and at the hot end (B).

(A) Push-in fitting, extruder (B) Push-in fitting, hot end

- 1 Heat the nozzle to 200 °C, remove the filament, then switch off and let the hot end cool.
- 2 Press the collet of the fitting (A or B) and pull the tube out.
- 3 Check the tube end at the hot end: it must be clean, round and cut at right angles. Cut or replace a damaged end.
- 4 Push the tube in until it stops at the nozzle or in the extruder.
- 5 Pull the tube lightly: it must not move in the fitting. Replace a fitting that does not hold: E3-50-090 (sheet 50B, item 2).

8.11 Lubricating the Z lead screw

Creality recommends grease or lubricant on the lead screw^{CG}. A dry lead screw wears the brass nut and causes uneven layers.

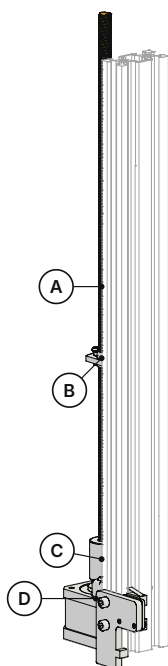


Figure 8-6 Z axis: lead screw (A), lead screw nut (B), shaft coupling (C) and Z motor (D).

(A) Lead screw (B) Lead screw nut (C) Shaft coupling (D) Z motor

- 1 Switch off and unplug the printer.
- 2 Wipe old grease and dust off the lead screw with a lint-free cloth.
- 3 Apply a thin layer of grease along the thread.
- 4 Move the gantry up and down by hand by turning the lead screw, to spread the grease.
- 5 Check the shaft coupling (C): its clamping screws must be tight and the coupling must not slip on the motor shaft or the lead screw.

8.12 Cleaning the fans and the electronics enclosure

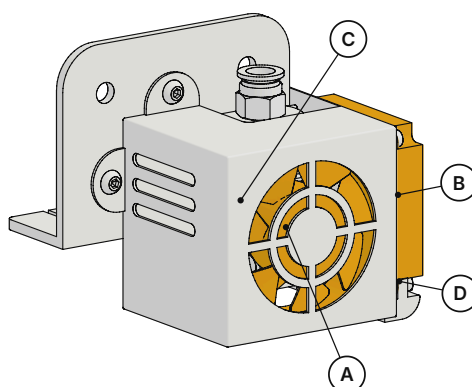


Figure 8-7 Print head fans: hot end cooling fan (A), part cooling fan (B), fan shroud (C) and part cooling duct (D).

(A) Hot end cooling fan (B) Part cooling fan (C) Fan shroud (D) Part cooling duct

- 1 Switch off and unplug the printer.

- 2 Remove the two screws of the fan shroud and lift it off^{CM}.
- 3 Hold each fan rotor with a finger and blow the dust out with compressed air.
- 4 To clean the mainboard fan, remove the bed as described by Creality and blow out the enclosure; level the bed afterwards^{CM}.
- 5 Refit the shroud without twisting or straining the fan cables.

8.13 Checking frame screws and electrical connections

- 1 Switch off and unplug the printer.
- 2 Check the M5 screws between base, uprights and top cross member with the 4 mm key. Tighten loose screws.
- 3 Check the screws of the motor brackets, the display bracket and the PSU.

8.13.1 Electrical connections

WARNING



Fire from damaged cables at moving parts.

The heated-bed cable bends with every movement of the bed. Broken strands heat up at the connector.

- Check the bed cable and its strain relief at the intervals in 8.2.
- Do not use the printer if a connector is discoloured, a cable is damaged or there is a smell of burning. Have the part replaced.

- 1 Look at the heated-bed cable along its full length and at both ends. Move the bed by hand and watch the cable: it must not be kinked or rub on the frame.
- 2 Check that the motor, limit switch and fan connectors are fully seated.
- 3 Check the XT60 power connectors between PSU and mainboard^{BOM} for discolouration.

8.14 Wear parts and spare parts

Use only parts with the specification in the spare parts catalogue FA-E3-SPC-EN. The table lists the wear parts that should be kept in stock.

Table 8-4 Wear parts

Part	Specification	Part number	Sheet / item
Nozzle	ø 0.4 mm, thread M6	E3-50-180	50B / 16
PTFE tube (Bowden tube)	OD 4 mm, ID 2 mm, L 400 mm	E3-50-210	50B / 27
Timing belt GT2, X axis	Width 6 mm, L 786 mm	E3-20-130	20C / 2
Timing belt GT2, Y axis	Width 6 mm, L 743 mm	E3-30-090	30D / 2
V-wheel	ø 24.1 mm, for 2 × 625ZZ	E3-20-020	20A / 2
Bed levelling spring	1.1 × 8 × 22 mm (wire × OD × free length)	E3-30-050	30A / 13
Thermistor, hot end	NTC 100 kΩ, ø 1.8 mm, lead 1000 mm	E3-50-140	50B / 11
Thermistor, heated bed	NTC 100 kΩ, ø 1.8 mm, lead 700 mm	E3-30-110	30D / 4
Heater cartridge	24 V, 40 W, ø 6 × 20 mm	E3-50-160	50B / 13

Part	Specification	Part number	Sheet / item
Extruder drive gear	∅ 11 mm (BOM: D11-40)	E3-50-060	50A / 9
Print surface sheet	235 × 235 × 1.0 mm	E3-30-010	30A / 2

Part numbers follow the example numbering scheme of the catalogue FA-E3-SPC-EN.

9 Troubleshooting

WARNING



Electric shock and burns during fault finding.

Fault finding can require access to live or hot parts.

- Switch off and unplug before you check cables or connectors.
- Let the hot end and bed cool down first.

9.1 Messages on the display

Table 9-1 Messages of the firmware

Message	Meaning	Remedy
Err: MINTEMP	A thermistor reads below the minimum temperature: sensor disconnected or broken ^{FW,TS}	Check the thermistor connector on the mainboard; replace the thermistor (E3-50-140)
Err: MINTEMP BED	As above, for the bed thermistor ^{FW}	Check the bed cable and connector; replace the bed thermistor
Err: MAXTEMP	The hot end exceeded 275 °C ^{FW} ; a clamped or damaged thermistor reads wrong ^{TS}	Switch off. Check that the thermistor is not crushed by its screw; replace it if damaged
Err: MAXTEMP BED	The bed exceeded 125 °C ^{FW}	Switch off. Check the bed thermistor and the mainboard; contact a qualified person
THERMAL RUNAWAY	The temperature did not follow the heater: thermistor out of its block, heater failure, or strong draught ^{FW}	Switch off. Check thermistor and heater fitting and wiring before you use the printer again
Heating failed	The heater did not reach the expected rise within the watch period ^{FW}	Check heater cartridge and wiring; protect the printer from draughts
No TF card	No card inserted or the card cannot be read ^{FW}	Insert the card; clean the card slot with alcohol if it no longer reads cards ^{CG}
KILLED. / STOPPED.	The firmware stopped the printer after an error ^{FW}	Read the message before it; switch off and remedy the cause

9.2 Faults and remedies

Table 9-2 Faults and remedies

Fault	Possible cause	Remedy	Section
Print does not stick to the bed	Nozzle too far from the bed; dirty surface	Level the bed; clean the surface ^{TS}	6.2
First layer scratched or nothing extruded at start	Nozzle too close to the bed	Level the bed	6.2
Circles not round, lines not touching	Belts loose	Tension the belts ^{TS}	8.5
Layer shifts	Belt slips; pulley grub screw loose; print head collided with a curled print	Check belts and pulleys; reduce speed	8.5

Fault	Possible cause	Remedy	Section
Wobble or play of print head, gantry or bed	Eccentric nuts loose	Adjust the eccentric nuts	8.6
Stringing or oozing	Retraction too small; temperature too high	Increase retraction; lower the nozzle temperature by 5 to 10 °C ^{TS}	7.2
Holes and gaps in top layers	Top/bottom thickness or infill too low; under-extrusion	Increase top thickness and infill; check extrusion ^{TS}	8.9
Extruder knocks, filament not fed	Nozzle clogged; gear dirty; temperature too low	Clean the gear; clear or replace the nozzle	8.9
Axis does not move normally	Motor or limit switch cable loose or swapped	Check the axis and limit switch cables ^{TS} ; the extruder only turns above 170 °C	8.13.1
Uneven layers along Z	Lead screw dry or bent; coupling loose	Lubricate the lead screw; tighten the coupling	8.11
Display dark, fans off	No mains supply; switch off; voltage selector	Check cable, switch and the voltage selector setting	5.3

10 Decommissioning and disposal

10.1 Temporary decommissioning

- 1 Remove the filament and store it in a closed bag with desiccant.
- 2 Clean the printer.
- 3 Switch off and disconnect the mains plug.
- 4 Cover the printer against dust, or pack it in the original packaging.
- 5 Before use again: check as in 7.1 and level the bed.

10.2 Final decommissioning

- 1 Remove the filament and the microSD card. Delete personal print files from the card if you pass it on.
- 2 Switch off, disconnect the mains plug and let the printer cool.
- 3 Remove the mains cable.

10.3 Disposal



The crossed-out wheeled bin on the printer or its packaging means that electrical and electronic equipment must not be disposed of with household waste (Directive 2012/19/EU, Article 14 and Annex IX).

- Take the printer to a separate collection point for waste electrical and electronic equipment, or return it to the retailer where take-back is offered.
- Separate collection allows the metals, plastics and electronics to be recycled and keeps hazardous substances out of the environment.
- Dispose of filament waste and failed prints with residual waste or according to local rules for plastics.
- Recycle the cardboard packaging with paper and the foam and bags with plastics, according to local rules.

Appendix A EU legislation traceability matrix

This appendix shows which EU legislation the issuer considers applicable to the Ender-3 as placed on the EU market, and where this manual provides the information for use that the legislation requires. It is an analysis by the issuer, not a declaration of conformity. The conformity assessment, the technical documentation, the CE marking and the EU declaration of conformity remain the responsibility of the manufacturer.

A.1 Applicability

Table A-1 Applicability of EU legislation

Legal act	Applies	Reasoning
Machinery Directive 2006/42/EC	Yes, until 19 January 2027	The printer is machinery as defined in Article 2(a): linked parts, several of which move, with a drive system other than human effort, joined for a specific application (building objects from material). The exclusions of Article 1(2)(k) cover household appliances, audio and video equipment, information technology equipment, ordinary office machinery, low-voltage switchgear and electric motors insofar as they are covered by the Low Voltage Directive. A material-processing machine with exposed belt drives and heated parts is not clearly within these areas; the issuer therefore treats it as machinery (conservative reading).
Machinery Regulation (EU) 2023/1230	Yes, from 20 January 2027	Replaces Directive 2006/42/EC from 20 January 2027, without a transition period. Article 2(2)(p) excludes ordinary office machinery but expressly excepts additive printing machinery for producing three-dimensional products, which confirms that 3D printers are in its scope.
Low Voltage Directive 2014/35/EU	Safety objectives apply	The printer is supplied at 115 / 230 V AC, within the voltage range of the directive. As machinery, the safety objectives of the Low Voltage Directive apply through Annex I, section 1.5.1 of the Machinery Directive, and the conformity assessment for electrical hazards follows the Machinery Directive. The principal elements of Annex I of 2014/35/EU are traced below.
EMC Directive 2014/30/EU	Yes	Apparatus with a switch-mode PSU, a microcontroller mainboard and stepper motor drivers.
RoHS Directive 2011/65/EU, Annex II as amended by Delegated Directive (EU) 2015/863	Yes	Electrical and electronic equipment; restriction of hazardous substances in homogeneous materials.
WEEE Directive 2012/19/EU	Yes	Electrical and electronic equipment; marking with the crossed-out wheeled bin and information to users in private households.
General Product Safety Regulation (EU) 2023/988	Partly	Consumer product. Because it is subject to Union harmonisation legislation, Article 2(1) applies the Regulation only to aspects and risks not covered by that legislation; Chapters IIa, III Section 1, V, VII and IX to XI do not apply. Chapter III Section 2 (distance sales, accidents), Chapter IV, Chapter VI and Chapter VIII (recalls and remedies) apply.
Radio Equipment Directive 2014/53/EU	No	The design contains no radio module; data reach the printer on a microSD card or by USB cable ^{BOM} .
Batteries Regulation (EU) 2023/1542	No	The bill of materials lists no battery ^{BOM} .

Legal act	Applies	Reasoning
Ecodesign Regulation (EU) 2023/826 (off mode, standby and networked standby)	No	Covers the household and office equipment listed in its Annex II, including information technology and printing equipment for the domestic environment. Annex I defines information technology equipment by its main function of handling data; the main function of the Ender-3 is building objects, so the issuer does not consider it in scope. Creality's declaration for its K1 printer lists no ecodesign measure either. The Ender-3 has no standby or networked standby mode (Table 3-5).

The matrix covers legal acts that set requirements on the product and its information for use. REACH (EC) No 1907/2006 Article 33 and the packaging legislation set information duties in the supply chain and on the packaging; they are outside the scope of a manual.

A.2 Requirements on information for use and where they are met

Table A-2 Traceability of requirements to this manual

Requirement	Provision	Where met in this manual
Machinery Directive 2006/42/EC, Annex I, section 1.7.4 (from 20 January 2027: Regulation (EU) 2023/1230, Annex III, section 1.7.4)		
Original instructions, marked as such, in an official language of the Union	1.7.4.1	Cover and page 2: original instructions in English
Business name and address of the manufacturer	1.7.4.2(a)	Document identification (page 2)
Designation of the machinery as marked	1.7.4.2(b)	1.1, 2.7
EC declaration of conformity or a document setting out its contents	1.7.4.2(c)	The manufacturer's EC declaration of conformity, supplied as a separate document
General description	1.7.4.2(d)	3.1, 3.2
Drawings, diagrams and explanations for use, maintenance and repair	1.7.4.2(e)	Chapters 3, 8; Appendix B; catalogue FA-E3-SPC-EN
Intended use	1.7.4.2(g)	2.1
Warnings concerning reasonably foreseeable misuse	1.7.4.2(h)	2.2
Assembly, installation and connection instructions	1.7.4.2(i)	Chapter 5
Putting into service and use, training of operators	1.7.4.2(k)	Chapters 6, 7; 1.2
Residual risks	1.7.4.2(l)	2.3
Protective measures by the user, including personal protective equipment	1.7.4.2(m)	2.4, 2.6
Transport, handling and storage	1.7.4.2(p)	Chapter 4
Operating method in case of accident or breakdown	1.7.4.2(q)	2.8, chapter 9
Adjustment and maintenance by the user	1.7.4.2(r), (s)	Chapter 8
Specifications of spare parts that affect health and safety	1.7.4.2(t)	8.14; catalogue FA-E3-SPC-EN

Requirement	Provision	Where met in this manual
Low Voltage Directive 2014/35/EU (safety objectives applied through Machinery Directive Annex I, section 1.5.1)		
Essential characteristics for safe use marked on the equipment or in an accompanying document	Annex I, 1(a)	3.5, 5.3
Safe assembly and connection	Annex I, 1(b)	5.2, 5.4
Protection against hazards, provided the equipment is used as intended and adequately maintained	Annex I, 1(c), 2, 3	2.5, 8.2
EMC Directive 2014/30/EU		
Instructions and information on precautions for assembly, installation, maintenance and use	Art. 7(7), Art. 18(1)	5.2, 8.13.1
Information for use in accordance with the intended purpose	Art. 18(3)	Chapters 6, 7
WEEE Directive 2012/19/EU		
Information to users in private households, including the meaning of the crossed-out wheeled bin symbol	Art. 14(2), 14(4), Annex IX	10.3
General Product Safety Regulation (EU) 2023/988		
Information in online offers: manufacturer, product identification, warnings and safety information	Art. 19	Content for the seller: page 2, 1.1, chapter 2

A.3 Standards relevant to this product

The following standards are relevant to the safety, EMC, substance and information requirements above. The issuer used EN IEC/IEEE 82079-1 and ISO 7010 / ISO 3864-2 to prepare this manual. The list does not state that the printer conforms to any of them.

Table A-3 Relevant standards

Standard	Subject
EN ISO 12100:2010	Safety of machinery; general principles for design, risk assessment and risk reduction
EN IEC 62368-1 (current edition 2024)	Audio/video, information and communication technology equipment, safety requirements; its scope includes business and office machines and is used for desktop 3D printers
EN 55032:2015+A11:2020	Electromagnetic compatibility of multimedia equipment, emission requirements
EN 55035:2017+A11:2020	Electromagnetic compatibility of multimedia equipment, immunity requirements
EN IEC 61000-3-2, EN 61000-3-3	Limits for harmonic current emissions; voltage fluctuations and flicker
EN IEC 63000:2018	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
EN 50419:2022	Marking of electrical and electronic equipment in accordance with Article 14(4) of Directive 2012/19/EU
EN IEC/IEEE 82079-1:2020	Preparation of information for use (instructions for use) of products; identical to IEC/IEEE 82079-1:2019
ISO 7010, ISO 3864-2	Registered safety signs; design of product safety labels and signal words

EN 60335-1 (household appliances) was considered and not used: a 3D printer is not a household appliance within the parts of that series. The edition 2020+A11:2020 of EN IEC 62368-1 was withdrawn on 2024-05-15 in the Estonian national catalogue and replaced by the 2024 edition; the edition to apply is the one referenced in the Official Journal at the time of the assessment.

Appendix B Electrical overview

Block diagram of the electrical system, drawn from the cable list of the Creality bill of materials^{BOM} and the firmware configuration^{FW}. It shows the connections, not the internal circuits. Work on the mains side only as a qualified electrician.

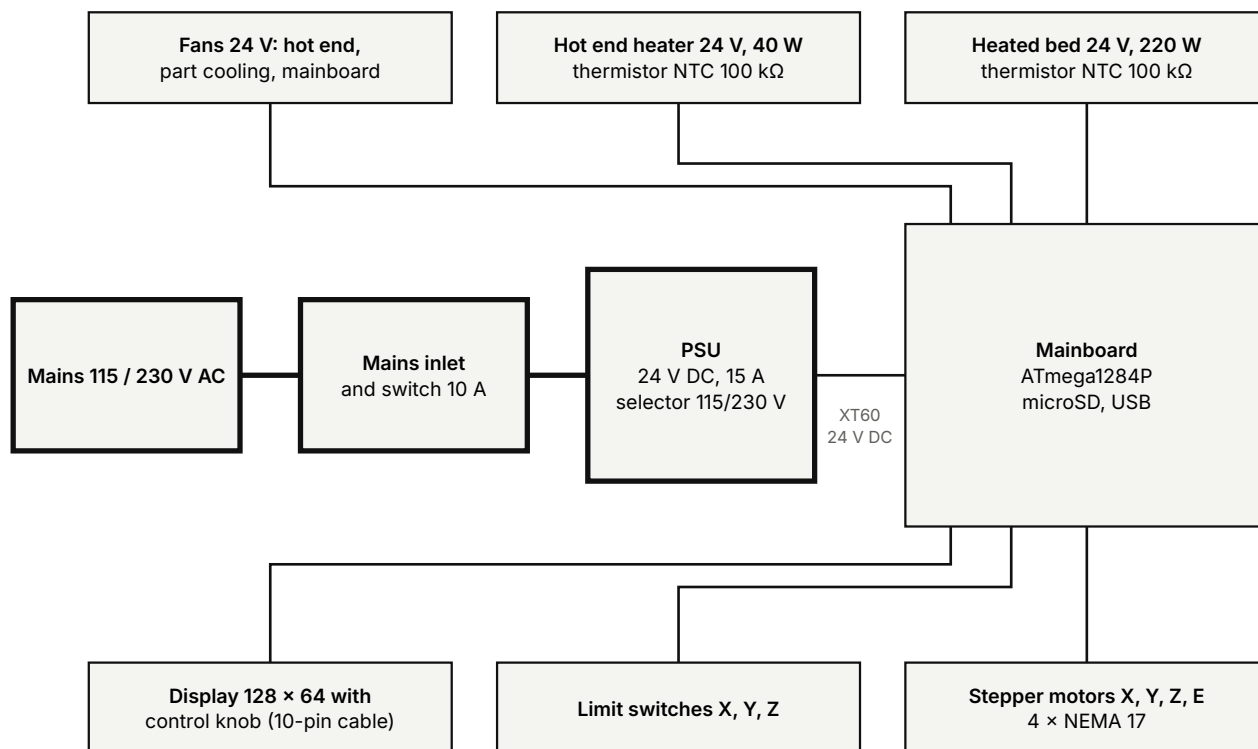


Figure B-1 Electrical block diagram. Mains voltage parts are shown with a heavy outline.

Table B-1 Cables (Creality BOM)

Cable	Specification	BOM code
PSU to mainboard	XT60, L 310 mm	400306222
Power line	XT60, L 170 mm	400306223
Heated bed cable	L 500 mm	400306217
X and extruder motor cables, X limit switch	Motor L 670 mm, limit switch L 750 mm	400306224
Y motor cable	L 420 mm	400306225
Z motor cable, Z limit switch	Motor L 280 mm, limit switch L 180 mm	400306226
Display cable	10-pin, L 470 mm	400306228

Appendix C Sources

Every technical value in this manual carries a source reference. The register of all values with the exact location in each source is kept with the generator of this document (provenance.md).

Table C-1 Source register

Ref.	Source
CAD	Creality, Ender-3 3D CAD assembly "Ender-3 Mechanical/STP/01 MAIN ASM Ender_3.STEP" (STEP AP214, exported from SolidWorks 2018 on 2018-08-17), repository https://github.com/Creality3DPrinting/Ender-3 , commit 88c7758, GPL-3.0.
BOM	Creality, "Ender-3 Mechanical/Ender-3 BOM.XLS" (bill of materials, 162 lines), same repository.
DWG	Creality, part drawings "Ender-3 Mechanical/PDF/*.pdf" (title blocks: material, surface treatment, general tolerance GB/T 1804-m), same repository.
FW	Creality, Marlin firmware configuration for the Ender-3, version 1.1.6.1 (2018-11-28), "Ender-3 Firmware (Marlin)/Ender-3 (includes power failure resume- English)/Marlin/Configuration.h, Configuration_adv.h, language_en.h, Version.h", same repository.
ASM	Creality, "Ender 3 3D Printer Instructions for assembly" (Ender-3 SD/1.Installing/Ender 3 instructions.pdf), same repository.
QSG	Creality, "Ender 3 Series 3D Printer Quick Start Guide" V1.0 (Ender-3 SD/1.Installing/Ender 3 quick start guide.pdf), same repository.
TS	Creality, "Trouble Shootings" (Ender-3 SD/3.Trouble Shootings/Trouble Shootings.pdf), same repository.
CP	Creality, Cura reference profile "Ender 3.ini" (Ender-3 SD/2.Software and USB Driver/CURA/Reference data), same repository.
CG	Creality, "Comprehensive Guide to Ender 3 3D Printer Operation", https://store.creality.com/blogs/all/ender-3-3d-printer-guide (retrieved 2026-10-28).
CM	Creality, "Ender-3 Daily Maintenance: What You Need to Do?", https://www.creality.com/blog/ender-3-daily-maintenance-what-you-need-to-do (retrieved 2026-10-28).
LS	Launch specification of the Ender-3 as published by CNX Software, "Creality Ender 3 3D Printer Sells for \$169.99", 2018-09-05, https://www.cnx-software.com/2018/09/05/creality-ender-3-3d-printer/ (retrieved 2026-10-28).
PK	Prusa Research, "i3 Printer Regular Maintenance", https://help.prusa3d.com/article/i3-printer-regular-maintenance_2072 (retrieved 2026-10-28); used as reference practice for a comparable Cartesian printer.
D	Derived by First Angle from the CAD model (measured or counted in the STEP assembly).
E	Recommendation of the issuer (First Angle), based on the sources named in the same row or section.