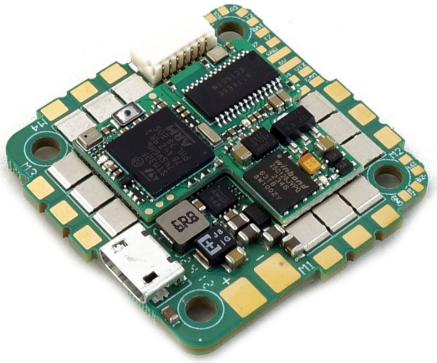
ROTORAMA

BLITZ Whoop F7 AIO

AIO board: F7 flight controller + 4× 55 A ESC, 2–6S
iFlight · version V1.1 · user manual



Before connecting a battery for the first time, solder a low ESR capacitor to the power pads. Always remove the propellers when testing the motors.

www.rotorama.com

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1. Safety instructions

1.1 Before you start

The iFlight BLITZ Whoop F7 AIO is a high-performance board for building an FPV drone that combines a flight controller (FC) and a 4-in-1 ESC on a single printed circuit board. It is intended for experienced users who can solder and configure a flight controller in Betaflight Configurator. Read this entire manual before installation.

- This product is not a toy. Keep it out of the reach of children.
- The manufacturer states that the product is for fun purposes only and does not support autonomous flight.
- Solder in a well-ventilated area, on a non-flammable surface and with suitable equipment. Make sure no solder bridges form between adjacent pads.
- Disconnect the battery whenever you work on the board.

1.2 Power and capacitor

Never power the board from a battery without a low ESR capacitor soldered to the power pads or the battery lead. The capacitor protects the electronics from voltage spikes generated by the running motors.

- Before connecting a battery for the first time, check the polarity of the battery lead (red wire = positive, black = negative) and use a multimeter to verify there is no short circuit between positive and negative.
- We recommend making the first connection through a short-circuit protection device (smoke stopper) or a current-limited bench power supply.
- Always keep the **propellers removed** during any motor test in Betaflight or on the bench.

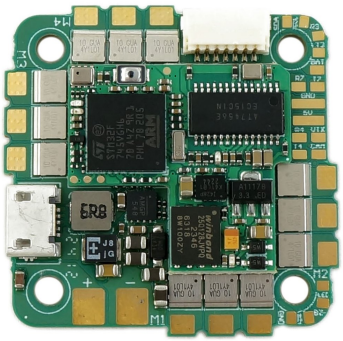
1.3 Li-Po and LiHV batteries

- The board is designed for 2S to 6S Li-Po or LiHV batteries. A battery with a higher cell count will destroy the board.
- Charge batteries only with a charger designed for the given cell type, on a non-flammable surface and under supervision.
- Do not continue using a damaged, swollen or overheated battery.
- Never leave a battery connected to the drone unattended.

2. Product description

2.1 What the board is for

The BLITZ Whoop F7 AIO board contains a flight controller with an STM32F745 processor and a 4-in-1 ESC rated at 55 A continuous current. The flight controller sits on a separate board that can be detached from the ESC board, which makes repairs possible. The board has a connector for direct connection of DJI O3 and Caddx Vista/Polar digital systems, an OSD chip for analog video, a barometer, blackbox memory and pads for a receiver, GPS, compass, LED strip and buzzer.



BLITZ Whoop F7 AIO – top view

2.2 Package contents

According to the manufacturer, the package contains:

Qty	Item
1×	BLITZ F7 AIO board
2×	470 µF / 35 V capacitor
1×	XT30U (male) cable, 18 AWG, 70 mm
1×	1.0-7P cable, 50 mm – 28 mm
1×	1.0-7P cable, 50 mm
4×	M2 silicone grommet
8×	M2 × 12 mm screw
8×	M2 transparent nylon nut
10×	black heat-shrink tube 0.8 mm, 10 mm

※ The battery, motors, frame, receiver, video transmitter and camera are not included.

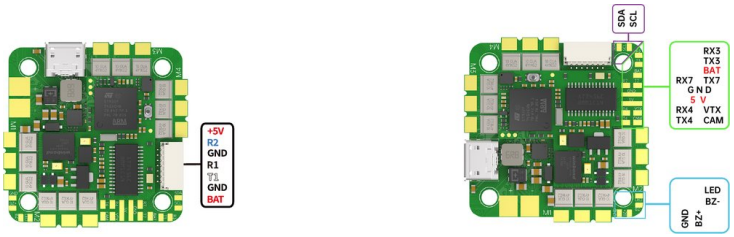
2.3 Specifications – flight controller (FC)

Parameter	Value
Processor (MCU)	STM32F745 (BGA package), 216 MHz
Gyroscope	ICM42688
Barometer	DPS310
OSD	AT7456E
Blackbox	16 MB, onboard flash memory
BEC output	5 V / 2.5 A
WS2812 LED strip	yes
Buzzer	yes
USB connector	Micro-USB
VTX control	SmartAudio, IRC Tramp
Betaflight firmware (target)	IFLIGHT_BLITZ_F7_AIO
Mounting pattern	25.5 × 25.5 mm, Ø 3 mm
Dimensions	35 × 35 mm
Weight	10.5 g
Input voltage	2–6S, supports LiHV batteries

2.4 Specifications – ESC

Parameter	Value
ESC processor (MCU)	BB21
Driver	FD6288
Input voltage	2–6S, supports LiHV batteries
Output current	55 A continuous, 65 A peak (10 s)
ESC firmware	Bluejay, target Q-H-40
Current sensor	scale 200
BEC	no
ESC telemetry	no
Bidirectional DShot	yes (requires Bluejay firmware)
Protocols	DShot150, DShot300, DShot600, MultiShot, OneShot, etc.

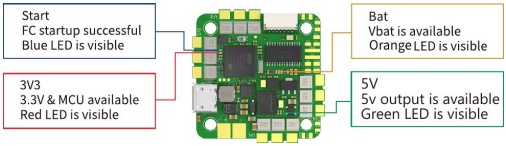
2.5 Solder pad layout



Pad layout – digital VTX connector on the left, peripheral pads on the right (taken from the manufacturer's diagram)

Pad	Function
+5V, R2, GND, R1, T1, GND, BAT	7-pin connector for a digital video transmitter (DJI, Caddx); BAT = battery voltage
RX3, TX3	UART3 – typically a receiver (SBUS, CRSF)
RX7, TX7	UART7 – e.g. VTX control or an FPort receiver
RX4, TX4	UART4 – e.g. GPS
SDA, SCL	I2C bus – compass (magnetometer)
VTX, CAM	video output to an analog VTX, video input from the camera
LED	data output for a WS2812 LED strip
BZ+, BZ−	buzzer
5V, GND, BAT	power for peripherals
M1–M4	motor solder pads

2.6 Status LEDs



Status LEDs on the board (taken from the manufacturer's diagram)

LED	Meaning
blue (Start)	FC startup successful
red (3V3)	3.3 V and MCU available
orange (Bat)	Vbat is available
green (5V)	5 V output is available

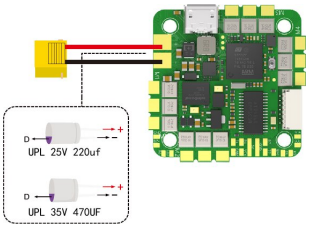
3. Installation and power

3.1 Mounting in the frame

Mount the board in a frame with a 25.5 × 25.5 mm mounting pattern using the supplied M2 screws, silicone grommets and nylon nuts. The silicone grommets dampen vibrations transmitted from the frame to the gyroscope. Do not overtighten the screws so that the grommets remain flexible. Make sure the board does not touch the carbon frame – carbon is electrically conductive.

3.2 Battery lead and capacitor

- This is a tiny high power AIO board. It is **necessary to add a low ESR capacitor** on your battery pads or battery lead. There is a choice of capacitors already in the package.
- 4S motors usually need 25 V / 220 µF and up; for bigger and more aggressive 6S motors use at least 35 V / 470 µF. It is necessary to protect the hardware from motor-generated back EMF and voltage spikes.
- Observe the capacitor polarity – the negative lead is marked on the capacitor body.
- The manufacturer's diagram also shows the option of installing an Anti-Spark filter between the battery connector and the board. The filter is not included.



Connecting the battery lead and capacitor (taken from the manufacturer's diagram)

Solder the XT30U battery lead to the battery pads: red wire to positive, black to negative. Cut the capacitor leads as short as possible and solder them to the same pads.

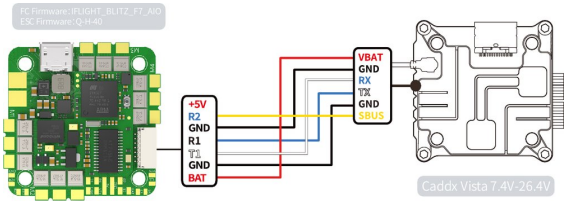
3.3 Connecting the motors

Solder the motor wires to pads M1–M4. The motor order and position must match the *Quad X* diagram in Betaflight (*Motors* tab). The order of the three wires of a motor only determines its direction of rotation, which can later be changed in software (chapter 5.3).

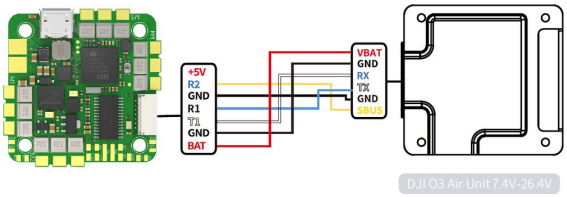
4. Connecting peripherals

All images in this chapter are taken from the manufacturer's original wiring diagram for version V1.1. The screenshots are from Betaflight Configurator.

4.1 DJI / Caddx digital video transmitter



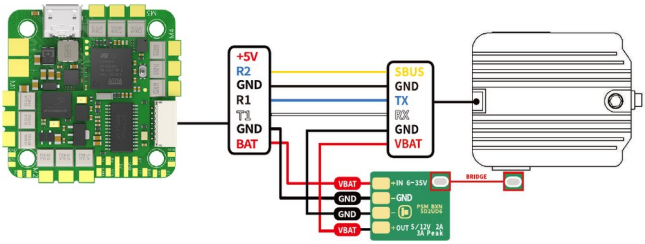
Caddx Vista (7.4–26.4 V)



DJI O3 Air Unit (7.4–26.4 V)

Connect the digital video transmitter to the connector on the board using the supplied 7-pin cable. The connector carries the +5V, R2, GND, R1, T1, GND and BAT pads. The R1/T1 lines are used for MSP communication (OSD); the R2 line is connected to the SBUS output of the DJI unit.

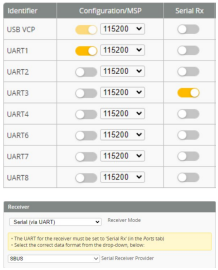
Caution: the DJI Plug&Play connector has a VBAT passthrough! Please remember, the DJI Air Unit (7.4–17.6 V) can only handle up to 4S! To fly 6S batteries, please use an additional BEC (voltage regulator).



Powering the DJI Air Unit via an additional BEC when using 6S (taken from the manufacturer's diagram)

▶ Port setup in Betaflight

In the *Ports* tab, enable *Configuration/MSP* on UART1 and *Serial Rx* on the UART the SBUS signal is connected to. In the *Receiver* tab, select *Serial (via UART)* and the *SBUS* protocol.



Ports tab and receiver settings for DJI according to the manufacturer's diagram

▶ SBUS protocol between the goggles and Betaflight

- Please check your protocols, otherwise your DJI remote controller won't input signals. The DJI Goggles protocol and the Betaflight protocol have to match.
- For lower signal latency, use the SBUS_BAUD_FAST protocol option on both ends. In Betaflight, copy/paste **set sbus_baud_fast=on** into the CLI, hit Enter, then use **save** to save the changes.
- Default: *sbus_baud_fast=off*, Goggles protocol set to NORMAL.

▶ OSD display with the DJI O3 Air Unit

In the Betaflight Configurator CLI, set the OSD device to MSP:

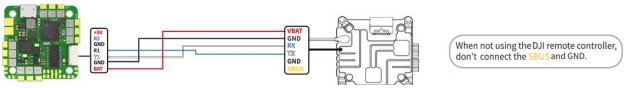
① **set osd_displayport_device = MSP**

② **set displayport_msp_serial = 0** – specifies the serial port of msp_displayport; the number is the UART number minus 1 (0 for UART1).

③ Type **save** and exit the CLI.

4.2 Digital system without the DJI remote controller

When not using the DJI remote controller (controlling the drone via the DJI unit), don't connect the SBUS and GND wires of the DJI unit.

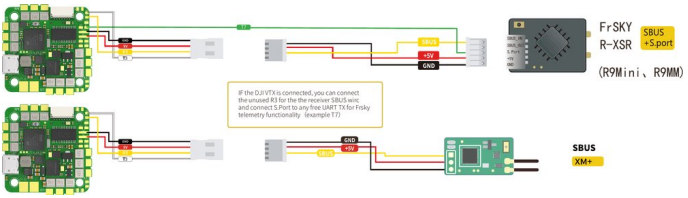


Wiring the digital unit when using a separate receiver

4.3 Receivers

▶ SBUS (e.g. FrSky R-XSR, XM+, R9 Mini, R9MM)

- Connect the SBUS signal to the R3 pad and power to 5V and GND.
- If the DJI VTX is connected, you can use the unused R3 pad for the receiver SBUS wire and connect S.Port to any free UART TX pad for FrSky telemetry (for example T7).
- In Betaflight, enable *Serial Rx* on UART3 in the *Ports* tab; in the *Receiver* tab, select *Serial (via UART)* and the *SBUS* protocol. For S.Port telemetry, set *Telemetry Output* to *SmartPort* on the UART it is connected to and enable the *TELEMETRY* feature.



Wiring SBUS receivers

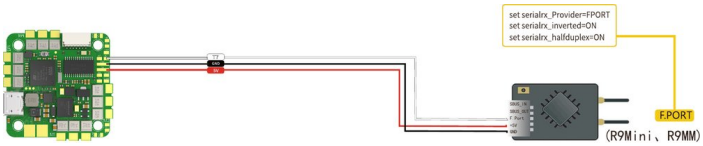
▶ CRSF (TBS Crossfire Nano, ExpressLRS)

- Connect the receiver to the R3, T3, 5V and GND pads so that the receiver TX goes to the board RX and the receiver RX goes to the board TX.
- In the *Ports* tab, enable *Serial Rx* on UART3; in the *Receiver* tab, select *Serial (via UART)* and the *CRSF* protocol, and enable the *TELEMETRY* feature.



Wiring TBS Nano and ELRS receivers (CRSF protocol)

▶ FPort (FrSky R9 Mini, R9MM)

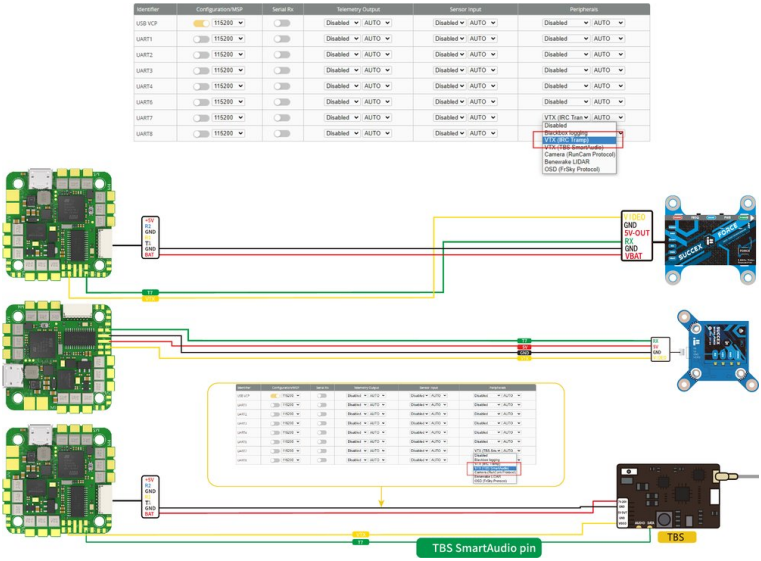


Wiring a receiver with the F.Port protocol

- Connect the F.Port signal to the T7 pad and power to 5V and GND.
- In the *Ports* tab, enable *Serial Rx* on UART7; in the *Receiver* tab, select the *FrSky FPort* protocol and enable the *TELEMETRY* feature.
- In the CLI, enter: **set serialrx_provider=FPORT**, **set serialrx_inverted=ON**, **set serialrx_halfduplex=ON** and save with **save**.

4.4 Analog video transmitter (VTX)

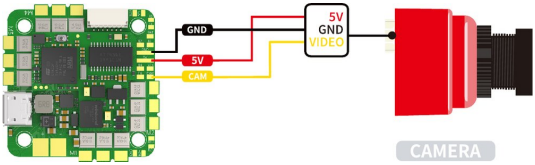
- Connect the VTX video signal to the VTX pad and the VTX control line to the T7 pad.
- Connect the VTX power to the BAT or 5V pad according to its supply voltage range – as shown in the image for each VTX type.
- In the *Ports* tab, set *VTX (IRC Tramp)* or *VTX (TBS SmartAudio)* for UART7 in the *Peripherals* column, depending on the video transmitter used.



Wiring analog VTXs with IRC Tramp and TBS SmartAudio control

4.5 Analog camera

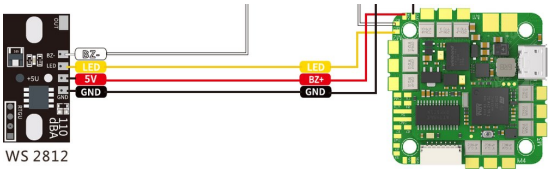
Connect the camera to the 5V, GND and CAM (video signal) pads.



Wiring an analog camera

4.6 LED strip and buzzer

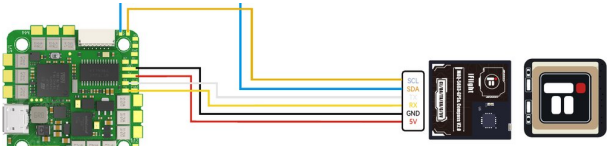
Connect the data input of the WS2812 LED strip to the LED pad and the buzzer to the BZ+ and BZ− pads. Connect the module power to 5V and GND.



Wiring a WS2812 LED and buzzer module

4.7 GPS and compass

- Connect the GPS to the RX4 and TX4 pads (crossed – module TX to board RX) and power to 5V and GND. Connect the module's compass to the SDA and SCL pads.
- In the *Ports* tab, select *GPS* in the *Sensor Input* column for UART4. Remember to configure a serial port (via the *Ports* tab) when using the GPS feature.
- In the *Configuration* tab, enable the *GPS* feature, the *UBLOX* protocol and, according to the manufacturer's diagram, the *Auto Config* and *Use Galileo* options.



Wiring a GPS module with compass

5. Firmware and configuration

5.1 Connecting to a computer

Connect the board to a computer with a Micro-USB data cable and launch Betaflight Configurator. When connected via USB, the ESCs and motors are not powered; to test them, a battery must be connected.

5.2 Flight controller firmware

- The flight controller uses Betaflight firmware, target **IFLIGHT_BLITZ_F7_AIO**.
- Back up your settings before flashing new firmware (*diff all* command in the CLI).
- When updating, select this target in the *Firmware Flasher* tab of Betaflight Configurator. Never flash firmware for a different target.

5.3 ESCs and motors

- The ESCs use **Bluejay** firmware (target **Q-H-40**). Bidirectional DShot (required for the RPM filter) is supported only with Bluejay firmware.
- In Betaflight, select the DShot protocol (DShot300 or DShot600) in the *Motors* tab and enable *Bidirectional DShot* as needed.
- The motor direction can be changed in the Bluejay configurator or with the *Motor direction is reversed* option in Betaflight – without resoldering the wires.
- The ESCs do not provide ESC telemetry.

5.4 Current and voltage measurement

In the *Power & Battery* tab, set the current meter source to *Onboard ADC* and the current scale (*Scale*) to **200** as specified by the manufacturer. Verify the measurement accuracy by comparing the consumed capacity with the amount the charger puts back into the battery.

5.5 Accelerometer calibration

Place the board mounted in the frame on a flat, level surface and run *Calibrate Accelerometer* in the *Setup* tab. Check that the drone model in the 3D view follows the actual tilt. If it does not, adjust the board orientation (*Board and Sensor Alignment*) in the *Configuration* tab.

6. First power-up and flight

6.1 Motor check

① Remove the propellers.

② Connect the battery (preferably through a short-circuit protection device) and check the status LEDs (chapter 2.6).

③ In the *Motors* tab, confirm the safety warning and spin up motors M1–M4 one at a time at low throttle. Verify the order and direction of rotation against the diagram in Betaflight.

④ Only after this check, fit the propellers according to the direction of rotation.

6.2 Arm, Disarm and failsafe

- In the *Modes* tab, assign the **Arm** function (motors on) to a switch on your radio transmitter. **Disarm** (motors off) immediately after landing or in a crash.
- In the *Failsafe* tab, set the behavior on signal loss and test it without propellers by switching off the radio transmitter – the motors must stop.

6.3 Battery voltage

Always use a **fully charged** battery before flight. End the flight at 3.5 V per cell at the latest. Store a battery you will not use for a longer time at storage voltage.

State	per cell	2S	3S	4S	5S	6S
fully charged Li-Po	4.20 V	8.4 V	12.6 V	16.8 V	21.0 V	25.2 V
fully charged LiHV	4.35 V	8.7 V	13.05 V	17.4 V	21.75 V	26.1 V
end flight	3.5 V	7.0 V	10.5 V	14.0 V	17.5 V	21.0 V
storage	3.8 V	7.6 V	11.4 V	15.2 V	19.0 V	22.8 V

Set up a battery voltage display in the OSD and a low-voltage warning in the *Power & Battery* tab.

6.4 Operating the drone

A drone built with this board is subject to the rules for operating unmanned aircraft. The law of the country where you fly is decisive – in the EU, Regulation (EU) 2019/947 and the national regulations of the given country (operator registration, pilot competency, operational limits, frequencies and transmit power). In the Czech Republic, information is provided by the Civil Aviation Authority (www.caa.cz).

7. Maintenance and troubleshooting

7.1 Maintenance

- After every crash, inspect the board, the motor solder joints, the battery lead and the capacitor.
- Protect the board from moisture, dust and metal debris. Remove flux residue after soldering with isopropyl alcohol.
- The flight controller can be detached from the ESC board; during repairs, make sure the interconnect connector is seated correctly.

7.2 Troubleshooting

Problem	Possible cause and solution
No LED lights up after connecting the battery	Check the polarity and joints of the battery lead; the orange LED indicates that battery voltage is present.
The computer does not recognize the board	Use a USB data cable, a different port and drivers; if the blue and red LEDs are on, the board has started.
The DJI remote controller does not control the drone	Does the SBUS protocol in the goggles match Betaflight? Is Serial Rx enabled on the correct UART? (chapter 4.1)
No OSD in the DJI O3 goggles	Check the MSP displayport commands (chapter 4.1).
A motor spins in the wrong direction	Change the direction in software (chapter 5.3).
VTX control does not work	Check the wiring to T7 and the protocol in the Ports tab (chapter 4.4).
The DJI Air Unit shuts down or is damaged on 6S	The Air Unit can handle up to 4S only; on 6S, power it via an additional BEC (chapter 4.1).

8. Information for the EU and Czech Market

8.1 Importer and responsible person in the EU

The product is placed on the European Union market by the importer stated below, who is at the same time the responsible person within the meaning of Article 16 of Regulation (EU) 2023/988 of the European Parliament and of the Council on general product safety (GPSR).

Importer / responsible person in the EU	Rotorama, s.r.o.
Company ID (IČO)	051 57 692
VAT ID (DIČ)	CZ05157692
Registered office	Okrajová 1351, 674 01 Třebíč, Czech Republic
E-mail	info@rotorama.cz
Phone	+420 252 252 098
Website	www.rotorama.com

8.2 Product conformity

CE

- The product bears the **CE** marking and complies with the requirements of the applicable European Union harmonisation legislation.
- A copy of the **EU Declaration of Conformity** is available from the importer at the address stated above or at the e-mail address info@rotorama.cz.
- **Product identification:** the type designation (iFlight BLITZ Whoop F7 AIO V1.1) is given on the product packaging; the firmware version of the flight controller is shown by Betaflight Configurator after connecting via USB.

8.3 Disposal of electrical equipment



- The crossed-out wheeled bin symbol on the product, its packaging or in the documentation means that at the end of its service life the product **must not be disposed of together with mixed municipal waste**.
- Hand it over at a take-back point for electrical equipment – at a collection yard, at a take-back point of a collective system, or at the retailer when purchasing a new equivalent product. Take-back is free of charge for the end user.
- The obligations under Act No. 542/2020 Coll., on end-of-life products, are fulfilled by the importer through a collective take-back system.
- Proper disposal helps prevent negative impacts on the environment and human health and contributes to the reuse of secondary raw materials.

Through its contractual partner **ASEKOL a.s.**, the company ensures the take-back of waste electrical equipment from households and the separate collection of waste electrical equipment, batteries and accumulators in accordance with the applicable legislation. The customer is entitled to hand over old electrical equipment or a battery or accumulator at any collection point of the above contractual partner. The addresses of these take-back points are listed at www.asekol.cz, www.ecobat.cz and also https://visoh2.mzp.cz/RegistrMistZO/RegistrMistZOPublic/MapaMistZpetOdberu.

9. Warranty and rights arising from defective performance

The rights and obligations of the contracting parties are governed by Czech law, in particular by Act No. 89/2012 Coll., the Civil Code, and Act No. 634/1992 Coll., on consumer protection.

- The seller is liable to the buyer for the product being free of defects on receipt. If the buyer is a consumer, a defect may be notified **within two years of receipt** of the product (Section 2165 of the Civil Code).
- If a defect appears within **one year** of receipt, the product is deemed to have been defective already at the time of receipt (Section 2161(5) of the Civil Code).
- When purchasing online, a consumer has the right to **withdraw from the contract within 14 days** of receiving the goods without giving a reason (Section 1829 of the Civil Code).
- Claims should be made with the retailer from whom you purchased the product. The importer's contact details are given in Chapter 8.1.
- The competent body for out-of-court settlement of consumer disputes is the **Czech Trade Inspection Authority**, Štěpánská 796/44, 110 00 Prague 1, www.coi.cz.