Nanofly20 O4

Sub250 · 2" FPV drone with DJI O4
User manual · 2S ELRS version



Read the entire manual before your first flight, especially chapters 1 and 3. The drone is not a toy and is not intended for children.

www.rotorama.com

Contents

1. Safety instructions

1.1 Before you start

1.2 Rotating propellers and mechanical hazards

1.3 Li-Po and LiHV batteries

1.4 Operating environment

2. Product description

2.1 Package contents

2.2 Parts overview

2.3 Specifications

2.4 AIO board: flight controller (FC), ESC and receiver

2.5 DJI O4 video transmitter

3. Legal requirements for operation in the Czech Republic and the EU

3.1 The law of the country where you fly applies

3.2 Drone classification and operating category

3.3 Operator registration and pilot competency

3.4 Operating limits

3.5 Flying with FPV goggles

3.6 Radio frequencies and transmit power

3.7 Privacy and insurance

4. Preparing for the first flight

4.1 What else you need

4.2 Choosing and connecting the battery

4.3 Propellers

5. Setup

5.1 Connecting to a computer

5.2 Binding the ExpressLRS receiver
5.3 Activating and linking the DJI O4
5.4 Accelerometer calibration
5.5 Checking motors and propellers
5.6 Arm, Disarm and failsafe
5.7 Firmware and further guides
6. Flying
6.1 Pre-flight check
6.2 Take-off and basic control
6.3 Monitoring voltage and ending the flight
6.4 Locating the drone after a crash
7. Maintenance and troubleshooting
7.1 After every flight
7.2 Replacing propellers
7.3 Replacing a motor
7.4 Storage
7.5 Troubleshooting
8. Information for the EU and Czech Market
9. Warranty and rights arising from defective performance

1. Safety instructions

1.1 Before you start

The Sub250 Nanofly20 O4 is a fast FPV drone with brushless motors and digital video transmission. Improper handling may cause personal injury, property damage or fire. The product is intended for experienced users aged 16 and over; we recommend that beginners first practise on a simulator.

- Read the entire manual before first use and keep it for future reference. If you pass the drone on to another person, include this manual.
- Do not operate the drone under the influence of alcohol, drugs or medication that impairs attention, or when tired.
- The drone is set up and tuned at the factory. Any modification to the structure, electronics or settings is at your own risk.
- The product contains small parts that children could swallow. Keep it out of the reach of children and animals.

1.2 Rotating propellers and mechanical hazards

The drone has no protective ducts. The propellers spin at very high speed and can cause cuts, especially to the eyes, face and fingers.

- **Remove the propellers** whenever you work on the drone (binding, configuring on a computer, firmware updates, motor checks).
- Connect the battery only just before the flight and disconnect it immediately after landing.
- Never reach into the propeller area while a battery is connected. Never catch the drone by hand in flight.
- After Arm (motors enabled), keep a safe distance from the drone; do not fly over people or animals.
- Replace damaged, cracked or bent propellers immediately.

1.3 Li-Po and LiHV batteries

The drone is powered by a two-cell (2S) Li-Po or LiHV battery, which is not included. Lithium batteries store a large amount of energy and can catch fire if handled improperly.

- Charge only with a balance charger designed for Li-Po / LiHV, on a non-flammable surface and under supervision. Never leave a charging battery unattended.
- Charge Li-Po to a maximum of 4.20 V/cell (8.4 V for 2S) and LiHV to a maximum of 4.35 V/cell (8.7 V for 2S). The charger mode must match the battery type.
- Do not discharge the battery below 3.5 V/cell (7.0 V for 2S) – see chapter 6.3.

- Do not use a swollen, punctured, hot or otherwise damaged battery. After a crash, remove it and observe it in a safe place for at least 30 minutes.
- Store and transport batteries in a fireproof bag at 3.8 V/cell (7.6 V for 2S).

1.4 Operating environment

- Fly only in open areas away from people, animals, vehicles, buildings, power lines and trees.
- Do not fly in rain, snow, fog, strong wind or poor visibility. The electronics are not waterproof.
- DJI specifies an operating temperature of −10 °C to 40 °C for the O4 video transmitter. At higher ambient temperatures, do not leave the drone switched on on the ground for long without airflow – the video transmitter heats up.
- Do not fly near airports, in no-fly zones or other geographical zones without permission (see chapter 3).

2. Product description

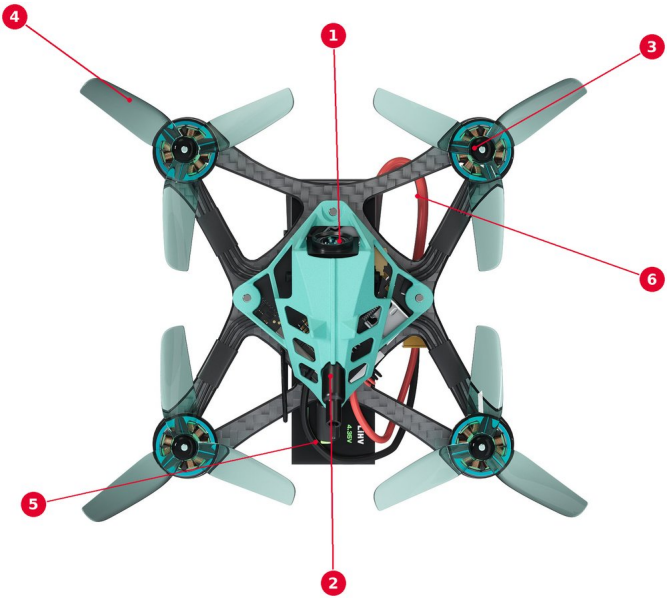
2.1 Package contents

- 1× Sub250 Nanofly20 O4 drone (2S ELRS version) with DJI O4 video transmitter
- 1× set of spare propellers
- 1× set of small parts (spare screws and small accessories)

Not included: battery, charger, radio transmitter (RC system), DJI FPV goggles or memory card (the O4 video transmitter has built-in storage and does not use a card).

※ The exact contents of the small-parts set (screws, tools, stickers, printed leaflet) may vary between production batches.

2.2 Parts overview



Top view (shown with a battery, which is not included)

① DJI O4 video transmitter camera
② DJI O4 video transmitter antenna
③ Sub250 1002 14000 KV brushless motor (4×)
④ HQProp 51 mm three-blade propeller (4×)
⑤ Battery holder under the frame
⑥ Power lead with XT30 connector

2.3 Specifications

Parameter	Value
Model	Sub250 Nanofly20 2S, DJI O4 version
Wheelbase (motor diagonal)	88 mm
Weight	77 g (according to the manufacturer, without battery)
Carbon frame plate thickness	1.5 mm
Motors	Sub250 1002 14000 KV
Propellers	HQProp 51 mm, three-blade (51mm×3), 1.5 mm shaft
AIO board	Sub250 RedFox A2 12A ELRS
Processor (MCU)	STM32F411
Gyroscope	ICM42688-P
ESC	12 A, integrated on the AIO board; Bluejay O-H-5 96K firmware
Receiver	ExpressLRS 2.4 GHz, integrated on the AIO board (UART)
Video transmitter / camera	DJI O4 Air Unit
Battery connector	XT30
Recommended battery	2S Li-Po / LiHV 450–550 mAh (the manufacturer specifies 2S 500 mAh 95C)

※ The weight including battery depends on the battery used. For the purposes of chapter 3, weigh the drone with its battery and all accessories.

2.4 AIO board: flight controller (FC), ESC and receiver

The drone is controlled by a **Sub250 RedFox A2 12A ELRS** AIO (all-in-one) board. It integrates the flight controller (FC) with an STM32F411 processor and Betaflight firmware, 12 A electronic speed controllers (ESC) with Bluejay firmware and an ExpressLRS 2.4 GHz receiver. The receiver is connected via UART and its firmware is updated separately (see chapter 5.7). A blue LED on the board indicates the receiver status.

Receiver LED	Meaning
double blink	the receiver is in binding mode
solid	the receiver is bound and connected to the radio

Flight controller data (battery voltage, flight mode, Arm status etc.) is shown in the goggles via the OSD of the DJI O4 video transmitter.

2.5 DJI O4 video transmitter

The drone is equipped with a **DJI O4 Air Unit** digital video transmitter. Its camera with a 1/2" sensor transmits the image to DJI goggles and at the same time records video to the built-in storage. The following data are specified by DJI:

Parameter (DJI O4 Air Unit)	Value
Frequency bands	5.170–5.250 GHz; 5.725–5.850 GHz
Transmit power (EIRP, CE)	5.1 GHz: <23 dBm; 5.8 GHz: <14 dBm
Live view	1080p, 30/50/60/100 fps
Video recording	up to 4K (3840×2160) 60 fps; 1080p up to 120 fps; MP4, max. 100 Mbps
Built-in storage	23 GB (memory cards not supported)
Lens field of view	117.6°
Stabilisation	RockSteady 3.0+, Gyroflow support
Compatible goggles and controllers	DJI Goggles 3, DJI Goggles N3 (+ DJI FPV Remote Controller 3); DJI Goggles 2, DJI Goggles Integra (+ DJI FPV Remote Controller 2)

※ Goggles from manufacturers other than DJI are not supported. The O4 camera gyroscope is more sensitive to vibration, which may affect RockSteady and Gyroflow stabilisation.

3. Legal requirements for operation in the Czech Republic and the EU

3.1 The law of the country where you fly applies

Regulations (EU) 2019/947 and 2019/945 apply in all EU member states, but national implementing rules differ from country to country – registration portals, minimum pilot age, geographical zones, mandatory insurance, permitted frequency bands and maximum transmit power. The information in this chapter describes the situation in the Czech Republic. If you operate the drone in another country, you must follow the regulations of the country in which you fly.

3.2 Drone classification and operating category

The Nanofly20 O4 is a ready-built drone **without a class label** (C0–C4), placed on the market after 1 January 2024. The transitional regime for drones placed on the market earlier (Article 20 of Regulation 2019/947) therefore does not apply, and it is not a privately built drone either. Although its weight is well below 250 g, according to the literal wording of the regulation it cannot simply be classified in subcategory A1 of the open category; moreover, according to EASA, FPV drones faster than 19 m/s do not fall into A1.

Legal operation is possible in particular within a **model aircraft club or association** holding an authorisation under Article 16 of Regulation 2019/947, or in the **specific category**. The interpretation is evolving; check the current conditions with the Civil Aviation Authority of the Czech Republic (ÚCL, www.caa.gov.cz) before your first flight.

3.3 Operator registration and pilot competency

- The drone carries a camera capable of capturing personal data and is not a toy. The operator must therefore **register** with the ÚCL (Drone Operator Portal, portaldron.caa.gov.cz), regardless of the drone's weight. Registration is free of charge.
- Display the assigned operator registration number visibly on the drone.
- Under Regulation 2019/947, the minimum pilot age is generally 16 years. The required competency depends on the operating category or on the club rules.

3.4 Operating limits

- The maximum flight height is 120 m above ground, unless the operating category or the club authorisation specifies otherwise.
- The drone must always be within visual line of sight – either of the pilot or of an observer (see 3.5).
- Do not fly over assemblies of people or over uninvolved persons.

- Respect geographical zones (airports, protected areas, military areas). A current zone map is available on the ÚCL website and from Air Navigation Services of the Czech Republic (dronview.rlp.cz).

3.5 Flying with FPV goggles

When flying with FPV goggles, the pilot cannot see the drone directly. Visual line of sight must therefore be maintained by an **observer** standing next to the pilot, who watches the drone with the naked eye (without optical aids) and warns the pilot of hazards in good time.

3.6 Radio frequencies and transmit power

The drone contains two radio transmitters: the DJI O4 video transmitter and the ExpressLRS receiver with telemetry. In the Czech Republic, their operation is governed by the general authorisations of the Czech Telecommunication Office (ČTÚ):

Band	Device	Conditions in the Czech Republic
2400–2483.5 MHz	ELRS receiver (telemetry)	max. 25 mW EIRP (VO-R/10)
5170–5250 MHz	DJI O4	max. 200 mW EIRP (VO-R/12); unmanned aircraft must not transmit in 5150–5170 MHz
5725–5850 MHz	DJI O4	max. 25 mW EIRP (VO-R/10)

- The maximum transmit power of the DJI O4 video transmitter is given in chapter 2.5. The maximum telemetry power of the ELRS receiver is given in the EU declaration of conformity (see chapter 8.2).
- Use the EU (CE) region setting in the DJI goggles. Unlocking FCC mode or other foreign limits is **illegal** in the EU.
- When updating the ELRS receiver firmware, select the EU regulatory domain (see chapter 5.7).
- The user is responsible for the power and frequency settings. Outside the Czech Republic, the limits of the respective country apply.

3.7 Privacy and insurance

- Do not photograph or film people without their consent and do not intrude on their privacy. Process recordings containing personal data in accordance with the GDPR.
- Third-party liability insurance for damage caused by drone operation is mandatory in the specific category (Section 54d of Act No. 49/1997 Coll.). We strongly recommend it even where it is not mandatory.

4. Preparing for the first flight

4.1 What else you need

- A **radio transmitter** with an ExpressLRS 2.4 GHz module (e.g. running EdgeTX firmware).
- **DJI FPV goggles** compatible with O4: DJI Goggles 3, DJI Goggles N3, DJI Goggles 2 or DJI Goggles Integra.
- **Batteries** 2S Li-Po / LiHV 450–550 mAh with XT30 connector and a suitable charger.
- A **computer** with Betaflight Configurator and DJI Assistant 2 (Consumer Drones Series), and a USB-C cable.

4.2 Choosing and connecting the battery

Use a **2S** (two-cell) Li-Po or LiHV battery with a capacity of 450–550 mAh and an XT30 connector. A battery with more cells will destroy the drone. The battery size must fit the holder under the frame.

2S battery state	Li-Po	LiHV
Fully charged	4.20 V/cell = 8.4 V	4.35 V/cell = 8.7 V
End flight	3.5 V/cell = 7.0 V	3.5 V/cell = 7.0 V
Storage	3.8 V/cell = 7.6 V	3.8 V/cell = 7.6 V

① Before the flight, insert a **fully charged** battery into the holder and secure it so that it cannot come loose in flight.

② Switch on the radio and goggles; the Arm switch must be in the Disarm position.

③ Connect the battery's XT30 connector to the drone's lead ⑥. Place the drone on a level surface and do not move it until the flight controller has finished initialising the gyroscope.

④ After the flight, Disarm first and then disconnect the battery.

4.3 Propellers

The drone uses **HQProp 51 mm** three-blade propellers with a 1.5 mm shaft hole. Propellers are made in two directions of rotation (CW and CCW). Each propeller must match the direction of rotation of its motor – incorrectly mounted propellers will flip the drone on take-off. Before the first replacement, note how the propellers are mounted at the factory and check the motor direction according to chapter 5.5.

- Push the propeller fully onto the motor shaft and tighten the screw, if used; do not overtighten.
- Use only undamaged propellers of the same type.

5. Setup

Keep the propellers removed during all procedures in this chapter.

5.1 Connecting to a computer

The flight controller is configured in **Betaflight Configurator**. Connect the drone to the computer with a USB-C cable via the flight controller port. To work with the motors (*Motors* tab), the battery must also be connected – keep the propellers removed.



Rear view (shown with a battery, which is not included)

- If the computer does not recognise the drone, try another cable (it must support data transfer) and check the USB drivers.
- Before changing any settings, back up the configuration: enter *diff all* in the *CLI* tab and save the output.

5.2 Binding the ExpressLRS receiver

The receiver is shipped **without a binding phrase set**. It can therefore be bound to a radio that also has no binding phrase set. The firmware of the ExpressLRS module in the radio must be compatible with the major version of the receiver firmware.

① Switch off the radio and remove the propellers.

② Power the receiver on and off three times in a row (using the battery or USB cable): on for 1 s, off for 1 s, on for 1 s, off for 1 s, on.

③ The receiver LED blinks twice – the receiver is in binding mode.

④ Switch on the radio, press *SYS* to open the tools menu and run the *ExpressLRS* (Lua) script.

⑤ Select *Bind*. The radio displays “Binding…”.

⑥ After a few seconds the binding window closes. If the receiver LED is solid, binding was successful.

If the LED keeps blinking twice, check the ExpressLRS script settings in the radio and repeat steps ④–⑤. If you use a binding phrase, set the same phrase in both the radio and the receiver (see chapter 5.7).

5.3 Activating and linking the DJI O4

The DJI O4 video transmitter must be **activated** before first use. A non-activated unit has limited transmit power and the menu of the connected goggles cannot be operated. Procedures according to DJI:

▶ Activation

① Download *DJI Assistant 2 (Consumer Drones Series)* from www.dji.com/o4-air-unit/downloads.

② Connect the battery (the video transmitter is powered by the drone) and connect the video transmitter to the computer with a USB-C cable.

③ Launch DJI Assistant 2, log in with your DJI account and activate the device following the on-screen instructions. Check for firmware updates at the same time.

▶ Linking with the goggles

① Switch on the drone and the goggles. All devices should have the latest firmware.

② The link status LED on the video transmitter is red. Briefly press its link button – the LED starts blinking red.

③ Press the link button on the goggles; the goggles start beeping.

④ When linking is successful, the video transmitter LED turns solid green, the goggles stop beeping and show the camera image.

The procedure may differ for individual goggle models – also follow the manual of your DJI goggles. The video transmitter heats up when switched on on the ground; carry out longer configuration with airflow or in short intervals.

5.4 Accelerometer calibration

The calibration is performed at the factory. Repeat it if the drone drifts sideways in Angle mode. Place the drone on a perfectly level surface and select *Setup* → *Calibrate Accelerometer* in Betaflight Configurator. Do not move the drone during calibration.

5.5 Checking motors and propellers

With the **propellers removed** and the battery connected, open the *Motors* tab, confirm the warning and briefly spin each motor with its slider. Check that the correct motor spins and that it rotates in the direction shown in the diagram on the tab. Then mount the propellers according to the direction of rotation (chapter 4.3).

5.6 Arm, Disarm and failsafe

- **Arm** (motors enabled) and **Disarm** (motors disabled) are controlled by a radio switch assigned in the *Modes* tab. Check the assignment before the first flight and adjust it if necessary.
- Arm is only possible with the throttle at minimum and the drone at rest. If Arm is not possible, the OSD or the *Setup* tab shows the reason.
- Practise Disarm before the first flight and always keep your finger on it.
- **Failsafe:** if the radio signal is lost, the flight controller stops the motors and the drone falls. Test this with the **propellers removed**: Arm, switch off the radio and check that the motors stop. The settings are in the *Failsafe* tab.

5.7 Firmware and further guides

- The **flight controller** runs Betaflight firmware, the **ESC** Bluejay firmware. The drone is tuned at the factory; updates are not required for operation. Always back up before updating (*diff all*).
- The **ExpressLRS receiver** is updated separately with ExpressLRS Configurator using the *BetaflightPassthrough* method (via the flight controller's USB). The manufacturer specifies the target *Sub250 2.4GHz → Sub250 2400 RX*. Select the EU regulatory domain.
- The **DJI O4 video transmitter** is updated with DJI Assistant 2 (chapter 5.3).

Official documentation for EdgeTX (radio) and ExpressLRS (radio link) is available at edgetx.org and expresslrs.org, Betaflight firmware at betaflight.com.

6. Flying

6.1 Pre-flight check

- The battery is **fully charged**, undamaged and firmly secured in the holder.
- The propellers are undamaged, correctly mounted and firmly on the shafts.
- The frame, motors and cables are undamaged; the video transmitter antenna and the receiver antenna are in place and clear of the propellers.
- The radio is charged, the correct model is selected, the Arm switch is in the Disarm position, throttle at minimum.
- The goggles show the image and OSD, and the battery voltage corresponds to a full charge.
- The flying area is clear, the observer is ready and the weather is suitable.

6.2 Take-off and basic control

- Place the drone on a level surface at least several metres away from yourself and other people.
- Arm and smoothly increase throttle. Fly low and slowly on your first flights until you get used to the drone's behaviour.
- If you lose orientation or a collision is imminent, Disarm immediately – a falling switched-off drone causes less damage than an impact at full power.
- After a crash, always Disarm first and only then go to retrieve the drone.

6.3 Monitoring voltage and ending the flight

Monitor the battery voltage in the goggles' OSD. End the flight at the latest when the resting voltage drops to **3.5 V/cell (7.0 V for 2S)**. During sharp throttle input the voltage briefly drops lower – the voltage during moderate flight is decisive. Deeper discharge permanently damages the battery.

6.4 Locating the drone after a crash

- Remember the crash site from the last image in the goggles; you can replay the goggles' recording.
- If you have configured the *DShot Beacon* function in Betaflight, you can make the motors beep with the assigned switch after Disarm.
- Disconnect the battery of the recovered drone immediately and check it for damage.

7. Maintenance and troubleshooting

7.1 After every flight

- Disconnect and remove the battery; let it cool down before charging.
- Check the propellers, frame, camera mount and screw tightness.
- Check that the motors spin freely without rubbing and remove grass and dirt from the shafts and windings.

7.2 Replacing propellers

Disconnect the battery, carefully pull the damaged propeller off the shaft and fit a new propeller of the same type and direction of rotation (chapter 4.3). Propellers may have hidden cracks after an impact – replace them if in doubt.

7.3 Replacing a motor

The replacement motor must be of the same type (Sub250 1002 14000 KV); replacement requires soldering on the AIO board with the battery disconnected. After replacement, check the direction of rotation in the *Motors* tab; reverse it in the ESC settings (Bluejay) or by swapping two motor wires.

7.4 Storage

- Store the drone in a dry place at room temperature, away from direct sunlight and out of the reach of children.
- Store batteries disconnected, at 3.8 V/cell (7.6 V for 2S), in a fireproof bag.

7.5 Troubleshooting

Problem	Possible cause and solution
Arm not possible	Throttle not at minimum, drone not at rest or no connection to the radio – the OSD or the *Setup* tab shows the reason.
Receiver does not bind	ELRS major firmware version or binding phrase does not match between radio and receiver; repeat procedure 5.2.
No image in the goggles	Video transmitter not linked or not activated (5.3), goggles not compatible with O4.
Drone flips on take-off	Propellers mounted the wrong way round or a motor spins in the wrong direction (4.3, 5.5).
Drone drifts sideways	Calibrate the accelerometer (5.4), check propellers and motors.
Strong vibration, jittery image	Damaged propeller, bent shaft or dirt in a motor – replace the faulty part.
Motor does not spin or stutters	Damaged motor or wires, dirt in the motor; check in the *Motors* tab.

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 (Sub250 Nanofly20 O4 – 2S ELRS) is shown on the product or on its packaging.

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.