LISBON SCRIMMAGE 2026

Build Your Robot in 30 Days

A complete, illustrated guide for new teams to assemble the 2025–26 FTC Everybot in time for Portugal's first FTC event.

TagusPark, Lisbon · 18 July 2026 · ftcportugal.org

Prepared by Team Thunderstrike 33535

The Mission

In 30 days, your team will build a complete, competition-ready FTC robot and roll it onto the field at the Lisbon Scrimmage on 18 July 2026 at TagusPark. That is a real, achievable goal — teams have done it before, and the design you are building was created specifically to make it possible. This guide walks you through every step.

The robot is the 2025–26 FTC Everybot, designed by Team 118 (The Robonauts) for the DECODE season. It is an open-source, fully-documented, competition-tested platform built on the REV ION ecosystem, and it has launched hundreds of rookie teams around the world. You are in good company.

What makes the Everybot the right choice

- Complete and proven. Mechanical design, electronics, autonomous, and TeleOp code are all published and tested by the Robonauts every season.
- Single-vendor sourcing. Every part comes from REV Robotics — one order, one shipment, one tracking number.
- Designed around the REV FTC Starter Kit. The kit covers most of the chassis, electronics, hand tools, and consumables in one box, so you spend zero time hunting for fasteners.
- Mecanum drivetrain. Smooth, intuitive driving for new pilots — strafe, rotate, and translate without learning a complex control scheme.
- Configurable. The Onshape CAD includes a configuration table so you can tailor the robot to whatever motor and wheel options you actually have on hand.
- Code is plug-and-play. The Robonauts publish a TeleOp and an Autonomous program. You install them, you drive.

Budget guidance: expect roughly €2,490 in parts landed in Portugal from revrobotics.eu (the EU storefront ships from within Europe, so no transatlantic shipping or customs brokerage). That is the cost of the kit of parts — the robot is not preassembled. The team builds it from these components, following the Robonauts manual.

Prerequisites

Before Day 1, make sure you have everything below. Almost all of the hand tools and consumables are included in the REV FTC Starter Kit v3.1, so the list is short.

People

- At least two students committed to the 30-day calendar. Two is the workable minimum; more is better.
- One adult mentor or teacher who can sign for purchases, supervise the workspace, and be present at the event. Does not need to know anything about robotics.

Workspace

- A small reserved table or bench, roughly 1.5 m × 1 m, that you can leave the partially-built robot on between sessions. A classroom corner, a garage, a maker space — anything you do not have to pack up every night.
- A wall outlet nearby for charging the battery and powering a laptop.
- Decent lighting. That is it.

A way to cut aluminium extrusion

The Everybot needs a couple of the kit's aluminium extrusions trimmed to length. Any one of the following works:

- A simple metal hand file plus a hacksaw — the cheapest and most foolproof option.
- A manual hacksaw on its own, finished with a file to deburr the cut.

- A powered cutter — angle grinder, mini circular cutter, or chop saw — if your school workshop has one. Faster but requires adult supervision and eye protection.

Computer

- One laptop running Windows, macOS, or Linux. Any laptop made in the last six years is fine.
- Android Studio installed (free), or alternatively, a Chrome browser with internet access for OnBot Java.
- Internet connection to clone the FtcRobotController repository and the Robonauts Everybot code from GitHub.

3D-printed parts (one of these two options)

The Everybot uses a small number of custom 3D-printed parts (intake guards, cable channels, mounting brackets). You have two ways to get them:

- Option A — 3D print them according to the Printing guide on the Robonauts documentation page.
- Option B — Buy a printed set from Team Thunderstrike 33535. We print Everybot parts on request and ship within Portugal. This is the easiest path if you do not have access to a 3D printer. See the Sourcing section for how to send us your specific configuration.

Tools you do NOT need to buy

All of the following are already included in the REV FTC Starter Kit v3.1, so do not waste money on them:

- Hex keys / Allen wrenches
- Screwdriver and adjustable wrench
- USB cables for the Control Hub
- Power and motor cables
- Surgical tubing
- Battery charger (one is included — see Section 6 if you want a second/faster one)
- Calipers, multimeter, soldering iron, Loctite — none of these are needed. The Everybot build involves no soldering and no measuring beyond what is in the manual.

Team Size

Two students is the minimum this guide assumes — enough to build the robot and cover both gamepads on match day. Most teams will have more, and that is great: extra hands speed up the build, split the workload, and give you depth on match day. Whatever your size, assign two roles below before Day 1.

Role	Match-day responsibility	What this role does during the build
Driver	Operates gamepad 1 (drivetrain).	Leads chassis and mechanism assembly. Helps install the Everybot code. Practices driving from Day 21 onward.
Operator	Operates gamepad 2 (mechanism).	Leads electronics and wiring. Helps install the Everybot code. Practices the second gamepad from Day 21 onward.
Everyone else	Pit crew and coaching.	Splits build work, runs inventory, handles 3D-printed parts, and supports the drive team on match day.

The 30-Day Calendar

Two hours per weekday plus one longer weekend session is enough. Day 1 is non-negotiable: place the REV order. International shipping is the long pole, so every day you delay is a day shaved off the build.

Days	Phase	What the team must do
1	Order day	☐ Place the REV Robotics order (Section 5). ☐ Order or arrange your 3D-printed parts (Section 5). ☐ Read this guide cover to cover.
2–14	Prep while you wait for shipping	☐ Read the DECODE game manual. ☐ Read the Robonauts Everybot build manual end to end. ☐ Watch the Robonauts intro video. ☐ Install Android Studio on the laptop. ☐ Clone the FtcRobotController repo from GitHub. ☐ Drop in the Robonauts EverybotTeleOp and EverybotAuto files, ready to flash the moment the parts arrive.
15–17	Unbox and chassis	☐ Inventory every part against the BOM. ☐ Assemble the Everybot mecanum chassis: side rails, cross members, motor mounts. ☐ Install mecanum wheels and bearings. ☐ Follow the Robonauts manual page by page.
18–20	Electronics	☐ Mount the Control Hub, Expansion Hub, battery, and switch from the DUO Control Bundle. ☐ Wire all four drive motors per the port map. ☐ Power-on test.
21–22	First drive	☐ Connect a Driver Hub or phone. ☐ Push the pre-loaded Everybot code to the Control Hub. ☐ Drive the bare chassis. ☐ Fix any reversed wheels in code.
23–25	Mechanism	☐ Build and mount the DECODE intake and scoring mechanism per the Robonauts guide. ☐ Install 3D-printed parts. ☐ Wire the intake and arm motors. ☐ Bench-test.
26–27	Autonomous and tuning	☐ Run the Robonauts auto routine on a taped-off practice area. ☐ Confirm button mappings. ☐ Driver and operator take turns on the sticks for at least one hour per day.
28	Self-inspection	☐ Run the Day-28 checklist (Section 7). ☐ Sizing cube. ☐ Weigh-in. ☐ Fix anything that fails.

Days	Phase	What the team must do
29	Pack	☐ Pack the carry case (Section 7). ☐ Charge every battery.
30	Travel to TagusPark	☐ Sleep. ☐ Eat. ☐ See you on 18 July.

Bill of Materials

The Everybot is built around a small handful of REV bundles. The Starter Kit v3.1 is the foundation — it ships with the structural extrusion, three UltraPlanetary Gearbox + HD Hex Motor units, a 12 V battery, a single-bay charger, all the hand tools you need, USB and power cables, surgical tubing, and the consumables. The DUO Control Bundle adds the Control Hub, the Driver Hub, and a REV USB gamepad. A separate Expansion Hub is required on top of the bundle — the Everybot needs more motor ports than the Control Hub provides on its own, so this is non-negotiable. The Mecanum Wheel Set gives you the four drive wheels. You then add four or five more UltraPlanetary + HD Hex Motor kits, plus a couple of small extras.

All prices below are pulled from revrobotics.eu (the EU storefront), which actually quotes in USD even though it ships from Europe. Cross-check the line items against the live Robonauts BOM in the Chief Delphi build thread before ordering — REV occasionally renames SKUs mid-season.

Core REV order

All revrobotics.eu prices below are pulled live with the storefront set to EUR. Portugal applies 23% IVA, which is added at checkout. Both numbers are shown.

Item	REV item (revrobotics.eu)	Qty	Ex-VAT (€)	Inc 23% IVA (€)
FTC Starter Kit	REV FTC Starter Kit v3.1 (REV-45-3529)	1	€695.70	€855.71
Control system bundle	REV DUO Control Bundle — Control Hub + Driver Hub + REV Gamepad (REV-35-2709)	1	€605.61	€744.90
Expansion Hub	REV Robotics Expansion Hub (REV-31-1153) — required for the Everybot's full motor count	1	€250.25	€307.81
Drive wheels	75 mm Mecanum Wheel Set (REV-45-1655)	1	€150.15	€184.68
Drive + mechanism motors[1]	UltraPlanetary Gearbox Kit & HD Hex Motor (REV-41-1600)	5	€225.25 (€45.05 ea)	€277.06
Subtotal			€1,926.96	€2,370.16

[1] *The Everybot uses 7 motors as a working bare-minimum bot, or 8 if you want the optional endgame mechanism. The FTC Starter Kit v3.1 already includes 3 UltraPlanetary + HD Hex Motor units, so you need 4 more for the bare-minimum build or 5 more if you want the endgame. We recommend ordering 5 to keep the option open. The UltraPlanetary kit is much more versatile than a fixed-ratio gearbox — the planetary stages are stackable so you can re-tune any motor's gear ratio later in the season as your design evolves, which is why this is the future-proof choice for any team.*

Small extras

These are not in the REV order. Source from a local hardware store, Amazon, or any hobby shop in Lisbon.

Item	Purpose	Approx. €
11/32 inch fiberglass rods (about 1 m total)	Used in the intake assembly per the Robonauts manual.	€8

Item	Purpose	Approx. €
Thick rubber bands / elastic bands (assorted)	Tensioning the intake mechanism.	€5
3D-printed parts set	Custom intake and bracket parts. Print yourself OR order from Team Thunderstrike 33535 (see Sourcing).	€20–€60

Estimated total landed cost

Category	Approx. €
Core REV order ex-VAT	€1,926.96
Portuguese IVA at 23%	€443.20
EU shipping (revrobotics.eu ships within Europe, typically €40–€80)	€60
Local extras (fiberglass rods, elastic bands, 3D prints)	€60
TOTAL parts landed in Portugal	≈ €2,490

Note: this is the cost of the kit of parts shipped to Lisbon. The robot is not preassembled — your team will build it from these components, following the Robonauts manual.

Sourcing

One vendor for the parts: REV Robotics. One vendor for the small extras: any local hardware store. One vendor (optional) for 3D-printed parts: Team Thunderstrike 33535.

REV Robotics

- Order from revrobotics.eu — the EU storefront. Ships from within Europe, so no customs brokerage and no transatlantic shipping.
- Order everything in the Core REV Order table on Day 1.
- Standard EU shipping is fine — typical transit to Portugal is 5–10 working days.

VAT exemption: *REV can apply a VAT exemption for accredited educational institutions. To use it, the school (not a student or coach personally) must contact REV before placing the order and pay through an official school purchase order. If this applies to you, the 23% IVA line in the BOM drops to zero.*

- Place the order on Day 1. Not Day 2. Day 1.

Local hardware (fiberglass rods, elastic bands)

- Any well-stocked hardware store in Lisbon will have 11/32 inch fiberglass rods (or the metric equivalent, 8.7 mm). Failing that, Amazon.es next-day delivery.
- Thick rubber bands: any office supply store or supermarket.

3D-printed parts

The Everybot needs a small set of custom 3D-printed parts. You have two options:

Option A: Print them yourself.

- 3D print according to the Printing guide on the Robonauts documentation page.

Option B: Order a printed set from Team Thunderstrike 33535.

If you do not have access to a 3D printer, we will print and ship a complete set of Everybot parts to you anywhere in Portugal. To order, send an email to info@teamthunderstrike.org with the configuration of your specific Everybot. We need to know which motor and wheel options you are using so we print the correct bracket variants. The Robonauts CAD on Onshape uses a configuration table to handle these variants — the next page shows you how to find your configuration in three clicks.

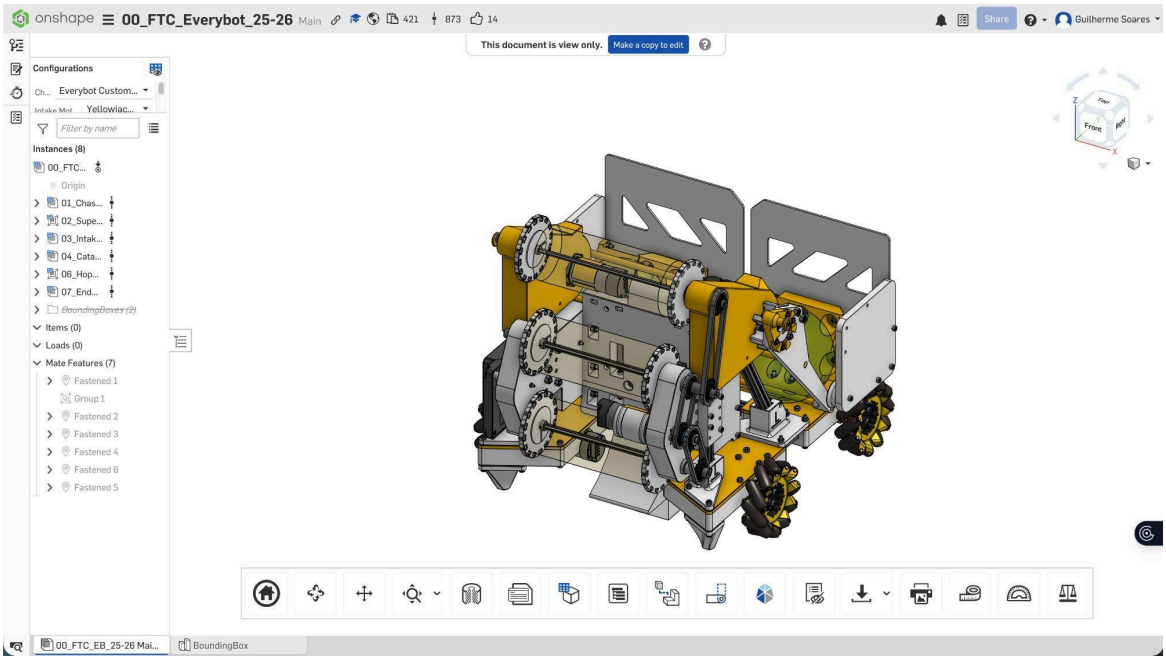
How to Find Your Onshape Configuration

The Robonauts publish the entire Everybot CAD as a public Onshape document. Onshape includes a configuration table that lets the design adapt to different hardware (motor brand, wheel size, intake variant, etc.). When you order 3D-printed parts from Thunderstrike, send us your configuration choices so we print the correct version. Here is how to find them.

Step 1 — Open the Robonauts Everybot Onshape document

Click the link below to open the public Onshape document in your browser. You will see the assembled Everybot in the 3D viewport. At the top of the window a banner will say *"This document is view only."* That is normal — view-only mode lets you look at the design but does not let you change the configuration.

Robonauts FTC Everybot CAD on Onshape

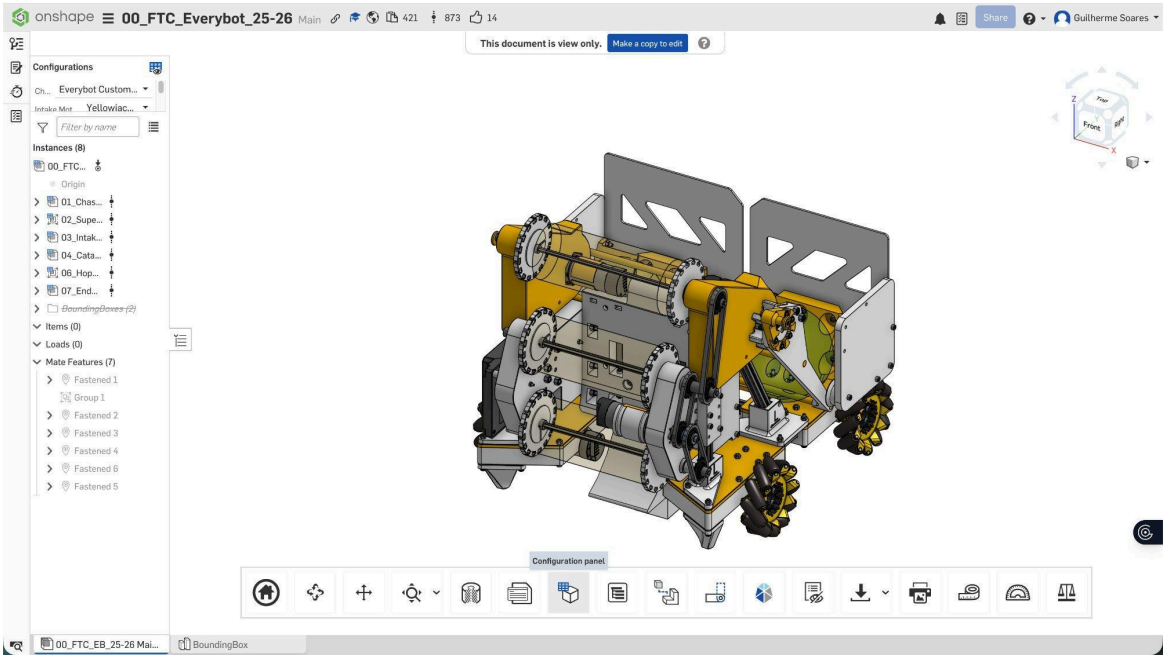


View-only mode. The toolbar at the bottom is collapsed and the Configurations panel on the right is read-only until you sign in.

Step 2 — Create a free Onshape account and sign in

To actually change configuration values, you need to be signed in to Onshape. Onshape is free for personal and educational use.

- In the top-right corner of the Onshape window, click Sign In or Create Account.
- Create a free account using your school or personal email. Confirm the verification email.
- Return to the Everybot link above and open the document again while signed in.
- Once signed in, the Configurations panel on the right side of the window becomes interactive — every dropdown is now selectable.

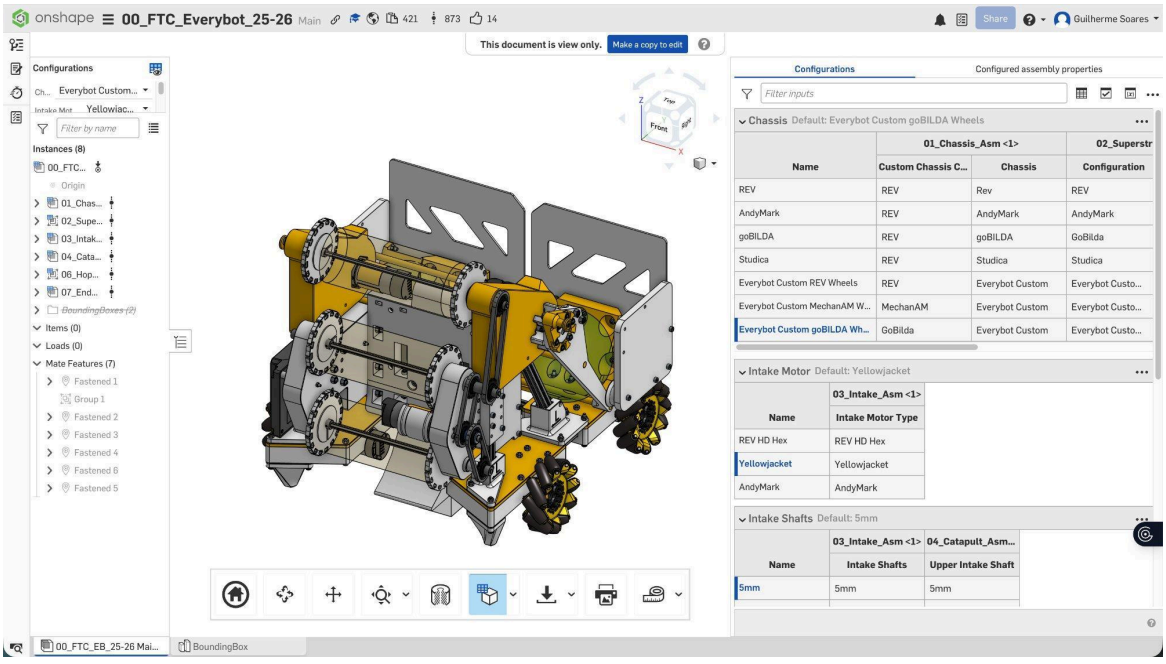


Once you are signed in, the bottom toolbar expands with all tools and the Configurations panel becomes interactive.

Note: even when signed in, the Robonauts document is still read-only for your account. You are changing the configuration of your view of it, which is exactly what you need to send the right printed parts to Thunderstrike. If you want to actually edit the CAD itself, click "Make a copy to edit" at the top of the window to copy the document into your own Onshape workspace.

Step 3 — Locate the Configurations panel and pick your values

On the right side of the Onshape window you will see the Configurations panel. It lists every configuration variable in the design — Chassis, Intake Motor, Intake Shafts, Catapult Motors, Endgame, and a few others. Each variable has its own dropdown table. Click the row that matches your selection in each table; the 3D viewport updates instantly.



The Configurations panel showing the Chassis, Intake Motor, and Intake Shafts tables with selectable rows.

Step 4 — Recommended configuration (matches the BOM in this guide)

If you ordered exactly the parts in the Bill of Materials in this guide, use the configuration below. This is the configuration Team Thunderstrike will print parts for by default.

Variable	Value
Chassis	Everybot Custom REV Wheels
Intake Motor	REV HD Hex
Intake Shafts	5 mm
Catapult Motors	HD Hex
Endgame	REV Motor

If you skipped the optional endgame mechanism, you can leave the Endgame row at its default — your robot will still drive, intake, and score, but it will not have the endgame action. See the footnote in the BOM for the motor count tradeoff.

Before moving on, cross-reference your configuration against the "3D Printing" document and the "2025–2026 FTC Everybot 3D Printing Guide" on the Chief Delphi build thread. The printable parts list varies between chassis and motor variants — check both documents to confirm which STLs you actually need for the configuration you picked.

Step 5 — If you are printing the parts yourself

Skip this step if you are outsourcing prints to Thunderstrike. If you are printing in-house:

- Open the Robonauts FTC Everybot documentation site and the Chief Delphi build thread, and download the STL files for the configuration you selected in Step 4.
- Match the exact configuration variant. Different chassis, intake motor, and intake-shaft choices use different bracket STLs — printing the wrong variant means parts will not fit.
- Print using the recommended slicer settings published in the Printing guide on the Robonauts documentation page (material, layer height, infill, supports, and orientation are all specified there).
- Start prints on Day 1 in parallel with placing the REV order, so the printed parts are ready by the time the REV shipment arrives around Day 14.

Step 6 — If you are outsourcing 3D-printed parts to Thunderstrike

If you are ordering printed parts from Team Thunderstrike 33535, email info@teamthunderstrike.org with the following:

- Your team name and the city you are shipping to.
- The exact value you picked for each configuration variable (Chassis variant, Intake Motor, Intake Shafts, Catapult Motors, Endgame, etc.).
- Whether you are building the optional endgame mechanism or not — this changes which printed parts we send you.
- Optional: a screenshot of your configured Onshape view, so we can sanity-check before printing.

Step 7 — Pick your robot colors (Thunderstrike print orders only)

Teams that order their printed parts from Thunderstrike get to choose the colors of their robot. We use part of the order to buy filament in your colors, so every Lisbon Scrimmage robot looks distinct on the field.

In the Robonauts Onshape model, the parts shown in white are the primary color and the parts shown in yellow are the secondary (accent) color. Open the CAD, look at the assembled robot, and use those two roles to picture how your color choices will read on the finished build.

- Pick a primary color — this replaces the white parts and dominates the look of the robot.
- Pick a secondary / accent color — this replaces the yellow parts and highlights the smaller features.
- Email both colors to info@teamthunderstrike.org along with your configuration from Step 6. Common filament colors (black, white, red, blue, orange, green, purple, grey, gold) are easy to source; if you want a specific brand or shade, send us a link or a hex code.

Recommended Purchases for the Competition

These are not in the build BOM. They are small competition-day quality-of-life items. The Lisbon Scrimmage will provide power strips and extension cords at every team's pit station, so you do not need to bring your own power.

Battery charging — pick one of these two options

The REV FTC Starter Kit v3.1 already ships with one single-bay REV battery charger. That is enough to compete, but you will be charging slowly between matches. Pick one of the upgrades below.

Option	What you get	Approx. €
Option A — A decent dual-bay charger (HiTec X2 AC Plus)	Charges two batteries simultaneously at up to 5 A each. The de facto FTC competition standard. Built-in AC, no external power brick. Use it with a Powerpole-to-banana adapter cable.	€140
Option B — A second REV single-bay charger	Identical to the one in your Starter Kit. Two chargers running in parallel cover the gap. Cheaper than Option A but slower per battery.	€55

Second REV 12V battery

The Starter Kit ships with one battery. Buy a second one. At competition you always want one battery on the robot and one on the charger. REV-31-1302, roughly €48.

Carry case

Bring a small plastic toolbox or fishing tackle box (roughly €20) to keep tools, fasteners, and spare parts organised in the pit. That is the only extra item to plan for.

Note: the DUO Control Bundle already includes one REV USB Gamepad, which is enough to compete. If you want a true two-person drive team — one driver, one operator — order a second REV USB Gamepad from revrobotics.eu (about €30 ex-VAT). It is recommended for a smoother match experience but not a requirement.

Bonus: The Engineering Portfolio

If you want to be considered for FTC judged awards — and you should, because the Inspire Award is the highest honor in FTC and it is open to rookie teams — you need to submit an Engineering Portfolio. This is the team's primary judged document. It is not required to compete, but it is required to be in the running for any judged award.

What it is

The Engineering Portfolio is a short document (current FTC limit is 15 pages including cover) that tells the judges who your team is, what you built, how you built it, and what you learned. It replaces the older Engineering Notebook for judging purposes, although many teams still keep an internal notebook as raw material for the portfolio. The portfolio is what you actually hand to the judges at the event.

Why it matters

Judges read the portfolio before they ever talk to your team. It shapes the questions they ask in your judging interview, and it is the primary evidence used to evaluate you for the Inspire, Think, Innovate, Control, Motivate, and Design awards. A clear, honest, well-organized portfolio from a rookie team often outperforms a flashy one from a veteran team. Judges reward authenticity and clear thinking.

What goes in it

- A short team introduction — who you are, where you are from, why you joined FTC.
- Your robot design summary — what the Everybot does, how it scores in DECODE, what choices you made.
- Your engineering process — how you used the Robonauts manual, what you adapted, what went wrong, how you fixed it.
- Outreach and impact — anything you did to share FTC with your school or community, even something small counts.
- A reflection — what you learned, what you would do differently next season.

Where to learn how to write a great one

These two resources are the gold standard for portfolio writing in FTC. Read them before you start drafting.

Game Manual Zero — The FTC Engineering Portfolio Guide

FIRST official Engineering Portfolio resources and rubrics

Even if you only put 4–5 hours into a portfolio in your first year, do it. It is the difference between competing and being recognized.

Pit Kit and Inspection

Pit kit (tape this list inside the carry case lid)

- Robot
- Two charged 12 V REV batteries
- Battery charger(s) and Powerpole adapter
- Driver Hub or Driver Station phone, charged
- REV USB Gamepad(s) — one is included in the DUO Control Bundle, bring a second if you ordered one
- Laptop with Android Studio and the Everybot code, plus a USB-C cable
- Spare HD Hex motor
- REV Starter Kit hand tool roll (hex keys, screwdriver, wrench)
- Spare M3 fastener kit
- USB-C right-angle adapter
- Water and snacks for the team

Day-28 self-inspection

- Robot fits in an 18"×18"×18" sizing cube at match start.
- All power wiring uses approved REV cables. No exposed conductors.
- Battery is firmly secured. Cannot fall out if the robot is flipped.
- Main power switch is reachable without tools and clearly labeled.
- Team number is displayed on at least two sides of the robot, large and legible.
- No sharp edges or exposed fasteners that could damage the field.
- Driver Station has the team number programmed.
- Both gamepads paired and labeled (1 = Driver, 2 = Operator).
- Robot weight under the season limit (check the FTC manual).

Common Failure Modes

Failure	Prevention
REV order arrives late	Order on Day 1, not Day 2. Pay REV's express international shipping.
Wrong wheel rotation direction	Bench-test on Day 21. Flip the direction in code, never swap wires.
Battery dies mid-match at competition	Buy a second battery and the dual charger (Section 7).
No one has driven the robot yet	Driver and operator take turns on the sticks for one hour per day from Day 21 onward.
Wires fall out under vibration	Zip-tie strain relief on every motor cable. The kit includes the zip ties.
Code does not deploy at competition	Test deploying from a cold-boot the night before. Bring the laptop.

Failure	Prevention
3D-printed parts arrive late or warped	If printing yourself, start prints on Day 1. If ordering from Thunderstrike, send your configuration on Day 1 too.

Resources

Lisbon Scrimmage event website — ftcportugal.org

Robonauts 2025–26 FTC Everybot — Chief Delphi build thread (BOM, manual, photos)

Robonauts FTC Everybot documentation site

Robonauts FTC Everybot CAD on Onshape

Robonauts FTC Everybot 2025 DECODE code on GitHub

REV Robotics — primary parts vendor

FtcRobotController GitHub repo

FIRST Tech Challenge — DECODE game manual and rules

Stuck on Day 12 with a wheel spinning the wrong way? Configuration question for the 3D prints? Email Team Thunderstrike at info@teamthunderstrike.org. We coach any team building their first robot for the Lisbon Scrimmage. We want to see you on the field on 18 July.

Glossary and Quick Links

Every link referenced in this guide, briefly stated, in one place.

Event

Lisbon Scrimmage 2026 — ftcportugal.org. Portugal's first FTC event, 18 July 2026 at TagusPark.

The robot

Robonauts FTC Everybot documentation — robonauts-everybot.github.io. The official build manual, wiring guide, and printing guide.

Chief Delphi build thread — 2025–26 Robonauts FTC Everybot. Build photos, BOM updates, and Q&A from the Robonauts and the FTC community.

Onshape CAD — Robonauts Everybot public document. The full parametric CAD with the configuration table you send to Thunderstrike.

Robonauts Everybot code — GitHub repo. TeleOp and autonomous, ready to flash to the Control Hub.

FtcRobotController — FIRST GitHub repo. The base Android Studio project the Robonauts code drops into.

Parts and suppliers

REV Robotics — revrobotics.com. Single vendor for the entire BOM.

REV FTC Starter Kit v3.1 — product page. Foundation kit: extrusion, three HD Hex motors, battery, charger, hand tools, cables, consumables.

REV DUO Control Bundle — product page. Control Hub + Driver Hub + REV USB Gamepad. Note: the Expansion Hub is NOT included and must be ordered separately.

REV Mecanum Wheel Set — product page. 75 mm mecanum wheels, 2 left + 2 right.

UltraPlanetary Gearbox Kit & HD Hex Motor — product page. The stackable planetary gearbox + HD Hex motor used everywhere on the Everybot. The kit includes 3; you need 4–5 more depending on whether you build the optional endgame.

REV 12V battery — product page. Buy a second one for competition.

REV Driver Hub — product page. Included in the DUO Control Bundle; the device the drivers actually hold.

HiTec X2 AC Plus dual charger — product page. Recommended dual-bay charger for competition pit.

REV Robotics Expansion Hub — product page. Required on top of the DUO Control Bundle to give the Everybot enough motor ports.

REV USB Gamepad — product page. One is included in the DUO Control Bundle. Buy a second one if you want a separate driver and operator (recommended).

FIRST and judging

FIRST Tech Challenge — DECODE game manual and rules. Official season documentation.

Game Manual Zero — Engineering Portfolio guide. The community gold standard for portfolio writing.

Help

Team Thunderstrike 33535 — info@teamthunderstrike.org. 3D-printed Everybot parts and free coaching for any team building for the Lisbon Scrimmage.