



FR3 DUO

Quick Guide for Installation

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QUICK GUIDE FOR INSTALLATION

This booklet will guide you through the steps to get your FR3 Duo up and running.

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NOTICE

This Quick Guide for Installation is not the manual of your Franka Research 3 robot and does not replace it.



Before operating robots from Franka Robotics, all people working with them must read the corresponding manual carefully. Read or download the manual (translations available) here: www.franka.de/documents.



Don't hesitate to contact your sales partner or integrator if you need more detailed information. Alternatively, you can get in touch with us directly by sending an email to: support@franka.de.

NOTICE

Please carefully follow all instructions, warnings, and other notes in this document and the official manual. Any deviation from the steps prescribed in these documents constitutes a misuse (as described in the paragraph "Misuse" of the corresponding manual). Franka Robotics does not assume any warranty and/or liability for any possible consequences.

 **DANGER**

Safety-related aspects must be considered when planning and designing the application and performing the hazard & risk assessment for completed machinery.

1 Introduction

This Quick Guide for Installation provides step-by-step instructions for assembling and connecting FR3 Duo. It is intended to help users quickly set up the hardware and prepare it for initial operation.

NOTICE

This manual applies to prototype hardware and is not certified according to safety standards. Use only in controlled environments by qualified personnel.

NOTICE

FR3 Duo is compatible with Franka Robot Arm v2.0 and later versions.

2 Legal Disclaimer

FR3 Duo is an experimental development tool provided solely for testing and evaluation. They are not part of the certified product portfolio of Franka Robotics GmbH and are supplied 'as-is' without any express or implied warranties, including but not limited to warranties of merchantability, fitness for a particular purpose, or conformity. The Supplier does not provide any support, maintenance, or updates for these tools. Any liability for material or legal defects (Material-legal defects) is excluded, except in cases of willful misconduct or gross negligence. This clause shall not affect mandatory liability under applicable product liability laws or for injury to life, body, or health.

3 Operational Guidelines

- **Qualified Personnel Only:** Operate and maintain prototypes only by trained individuals familiar with robotic systems.
- **Controlled Environment:** Use prototypes exclusively in supervised, indoor environments with stable surfaces.
- **Personal Protective Equipment (PPE):** Wear safety gloves and protective eyewear during assembly, adjustment, or maintenance.
- **Keep Clear of Moving Parts:** Never place hands or objects near active joints, drives, or robotic arms during operation.
- **Disconnect Power Before Maintenance:** Always power down and unplug the system before performing any adjustments or repairs.
- **Wireless E-Stop:** Always use the wireless E-Stop during operation of the prototype.

⚠ WARNING

Due to the heavy dead weight of the equipment and partly due to the geometric design, lifting and handling the equipment may cause physical injury. If the system or any of the components falls on a person, serious injury to fingers, hands, toes, and feet is possible.

- When transporting the equipment, always wear personal protective equipment (e.g., safety shoes, safety gloves).
- Always lift the equipment with the help of a second person.
- Follow the existing company regulations on lifting loads and personal protective equipment.

NOTICE

Always keep the original packaging in case of relocating the robot or its accessories.

Other User Devices

The risk assessment conducted does not cover additional interfaces/devices beyond those delivered with the system. Connecting additional user devices requires a renewed risk assessment to be performed by the user or system integrator.

Limitations, Constraints, and Misuse

Any application different from the intended use is a misuse and is not permitted. This includes, but is not limited to, the following uses:

Operational Misuse

- Transport of people or animals.
- Transport without original packaging.
- Use as climbing assistance.
- Leaning against the TMR.
- Handling of liquids.

Environmental Restrictions

- Use in potentially explosive areas.
- Use below ground or in confined spaces.
- Not designed for flammable/explosive environments.
- Use for the handling of radioactive objects.
- Use outdoors.
- Use in private environments, e.g., real homes.
- Use in the vicinity of children.

Safety And Compliance

- Use as a medical product.
- Use outside of the specified operating limits.

Expected Environment

- Location: Dry, indoor lab or industrial setting.
- Humidity: typically, non-condensing.
- Floor conditions: Clear paths; avoid uneven surfaces.
- Shared spaces: Allowed but require restricted access and monitoring.

Required Operator Skill Level

- Trained R&D or technical personnel only.
- Must complete safety briefing and understand:
 - Emergency stop procedures
 - Shared-space safety rules

4 Safety Guidelines

The following guidelines are essential for the safe operation and handling of prototype hardware. These instructions apply to FR3 Duo and all associated accessories.

The following notices are used throughout this manual to indicate the level of risk and importance of information:

DANGER

Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

WARNING

Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION

Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.







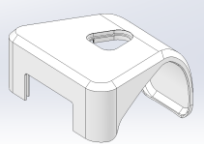
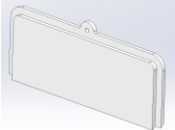
NOTICE

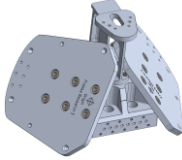
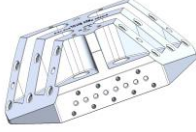
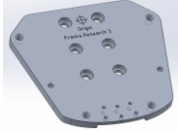
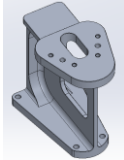
Indicates important information not related to personal safety, but essential for proper operation.

SAFETY-INSTRUCTIONS

Indicates processes or steps that must be strictly observed to ensure safe operation.

5 Scope of Delivery

ID	Component	Preview	Qty
S1	Franka Research 3		
S1.1	Franka Research 3 Arm		2
S1.2	Control		2
S1.3	Emergency Stop Device		2
S1.4	External Enabling Device		2
S1.5	Connecting Cable		2
S2	FR3 Duo Mounting Kit v0.3		
S2.1	FR3 Duo Cover v0.3		1
S2.1.1	Arm Base Cover		1
S2.1.2	Cables Lid		1
S2.1.3	Cables Lid Screw	CSPPNB-ST3W-TP4-5 (Self-tapping screw, $\varnothing 4 \times 5$)	1
Pos.	Component	Preview	Qty

S2.2	FR3 Duo Mount v0.3		1
S2.2.1	Base Block Duo		1
S2.2.2	Arm Adapter		2
S2.2.3	FR3 Duo Cover Bracket		1
S2.2.4	ISO 4762-M4x12	Hexagon socket cap screw,	4
S2.2.5	ISO 14580-M8x18	Hexagon socket cap screw, low head	12
S2.2.6	ISO 14580-M8x25	Hexagon socket cap screw, low head (ISO 4762 screws are also compatible)	6
S2.2.7	ISO 2338-6x10-h8	Alignment Pins	6

Tools Needed

- Torque Wrench
- 6 mm Hex Bit
- 5 mm Hex Bit
- 3 mm Hex Bit
- Loctite 243

NOTICE

The tools listed above are not included in the scope of delivery.

6 Optional Accessories

6.1 Pedestal v0.1

A wheeled pedestal that enables the flexible placement of FR3 Duo. It provides mounting brackets for two Franka Controls and an interface for installing the FR3 Duo at the necessary height.

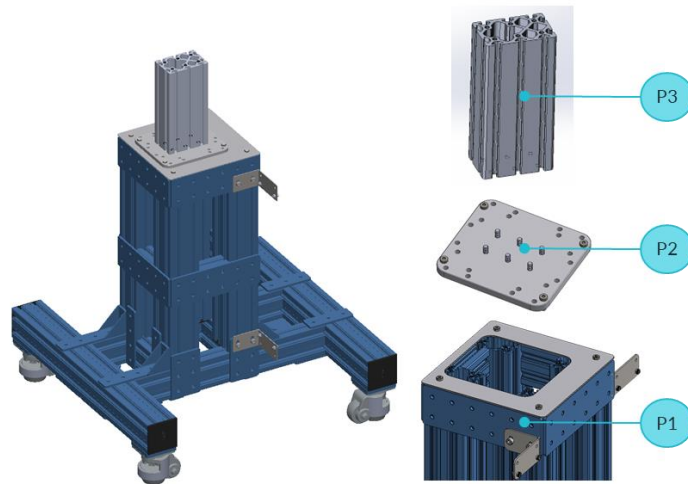
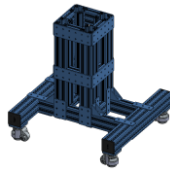
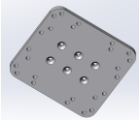





Figure 1: Pedestal composition

ID	Component	Preview	Qty	Notes
P1	Pedestal Base		1	Consists of a wheeled base and brackets for mounting two Franka Controls
P1.1	Vention Base 790mm		1	Wheeled base with a height of 790mm
P1.2	Cut-out cover plate		1	Cover plate
P1.3	Brackets for Franka Control		4	Brackets to mount two Franka Controls
P1.4	ISO 4762-M8x20		8	Hexagon socket cap screw
P1.5	ISO 14580-M8x25		4	Hexagon socket cap screw, low head (ISO 4762 screws are also compatible)
P1.6	ISO 4762-M6x12		8	Hexagon socket cap screw
P1.7	ISO 10511 M6		8	Locknut
P2	Mounting Plate Kit		1	Consists of Mounting Plate and necessary fasteners

P2.1	Mounting Plate		1	Interface plate between Pedestal and Item Profile
P2.2	ISO 10642-M8x25		6	Hexagon socket countersunk screw
P2.3	ISO 14580-M8x25		4	Hexagon socket cap screw, low head (ISO 4762 screws are also compatible)
P3	Item 80x120x248		1	Aluminum profile to achieve FR3 Duo Franka Reference Kinematics. See Chapter 8

NOTICE

Installation height depends on the use case. The components provided in the scope of delivery are designed to position FR3 Duo at the *FR3 Duo Franka Reference Kinematics* (Chapter 8). Adjusting height requires modifications for which the customer is responsible. In this case, the customer must procure an Item Profile of the required height to match their kinematics.

Tools Needed

- Torque Wrench
- 6 mm Hex Bit
- 5 mm Hex Bit
- 10 mm wrench (spanner or socket)
- Loctite 243

NOTICE

The tools listed above are not included in the scope of delivery.

6.1.1 Assembly Instructions: FR3 Duo with Pedestal

Step 1: Cut-out cover plate – Vention Base 790mm

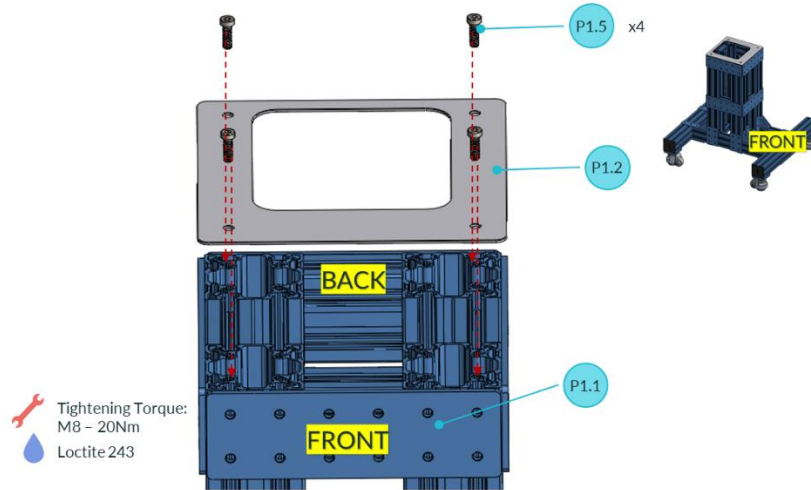


Figure 2: Assemble the cut-out cover plate

Step 2: Remove screws from Vention Base 790mm

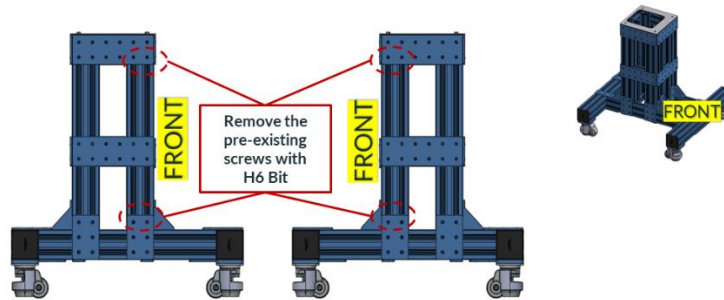


Figure 3: Remove screws from Vention Base 790mm

Step 3: Brackets for Franka Control – Vention Wheeled Base 790

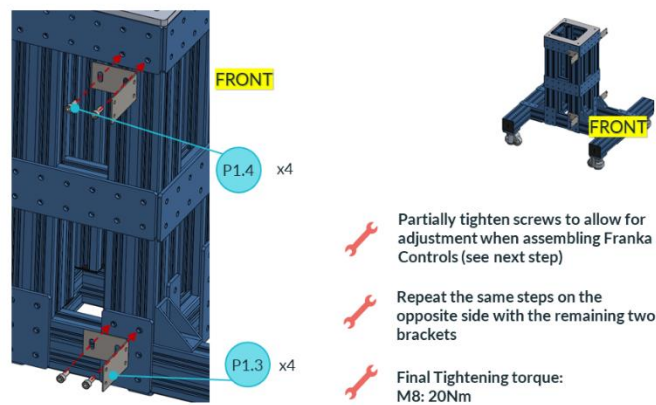


Figure 4: Front-side installation of brackets P1.3 and P1.4 with screws left partially tightened for alignment

Step 4: Mounting Plate – Item Profile

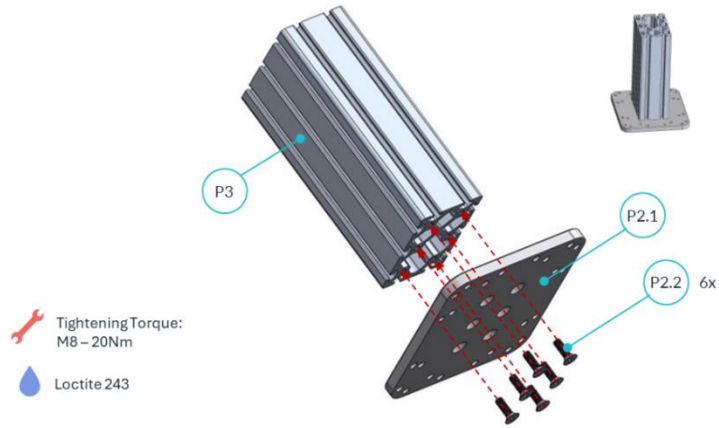


Figure 5: Mounting plate to Item Profile

Step 5: Item Profile and Mounting Plate – Pedestal

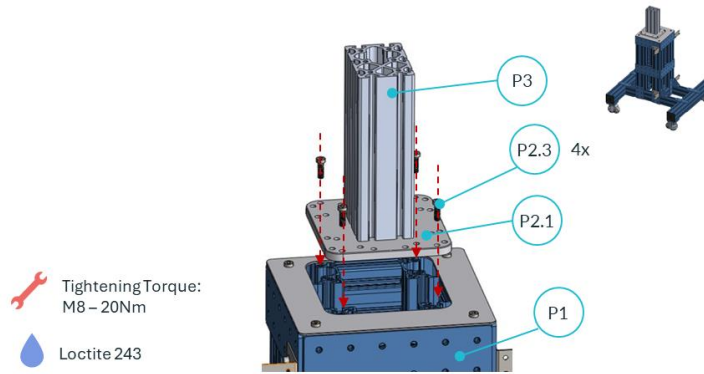


Figure 6: Item Profile and Mounting Plate to Pedestal

Step 6: Base Block Duo – Item Profile

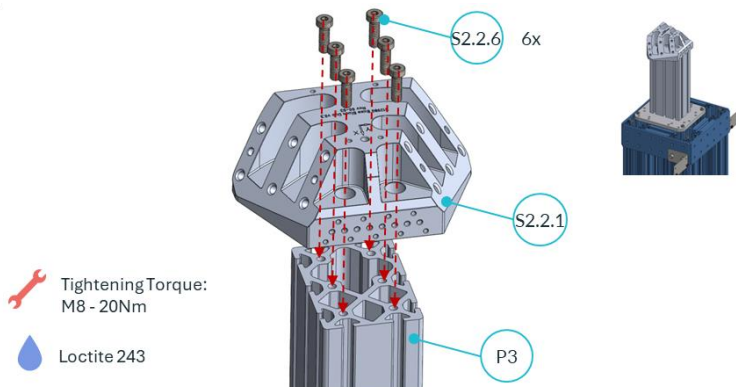


Figure 7: Base Block Duo to Item Profile

Step 7: FR3 Duo Cover Bracket – Base Block Duo

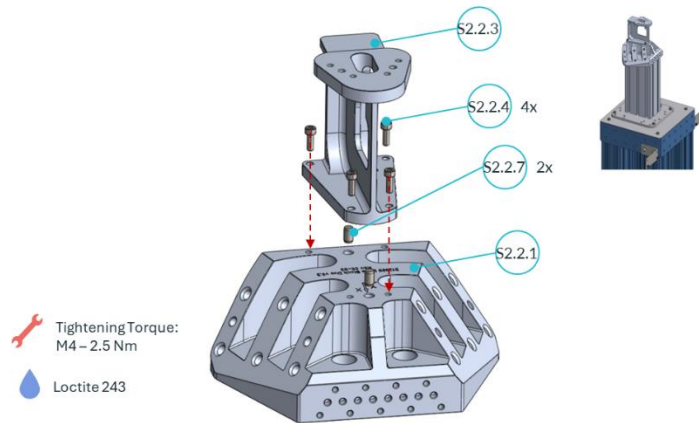


Figure 8: FR3 Duo Cover Bracket to Base Block Duo

Step 8: Arm Adapter Plate – Base Block Duo

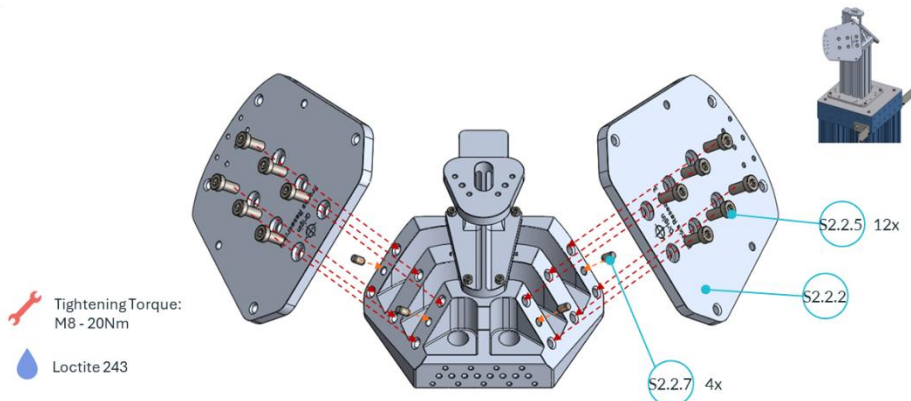


Figure 9: Arm Adapter Plate to Base Block Duo

Step 9: FR3 Arms – FR3 Duo Mount

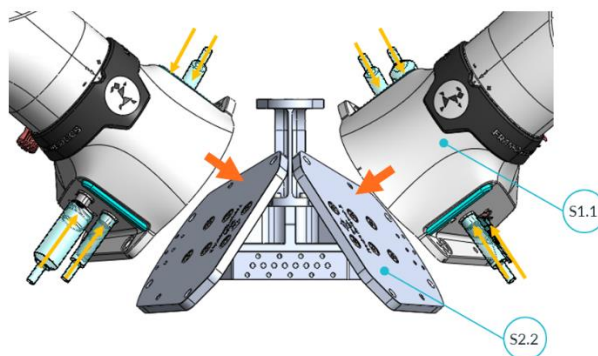


Figure 10: FR3 Arms to FR3 Duo Mount

- Mount two FR3 Arms on the Arm Adapter Plates and connect the necessary cables.
- Refer to the Product Manual of Franka Research 3 for detailed instructions of arm assembly.

Step 10: Place FR3 Duo Cover

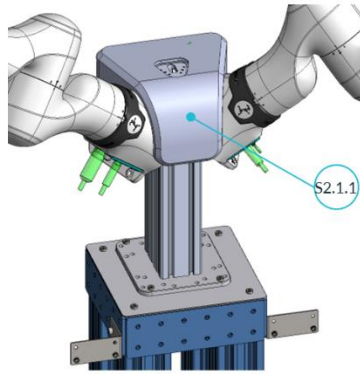


Figure 11: FR3 Duo Cover to FR3 Duo Mount

Step 11: (Optional) Assemble the Cables Lid

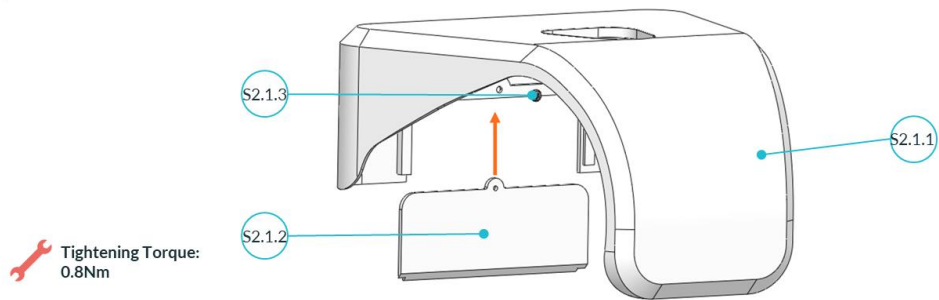


Figure 12: Cables Lid to Arm Base Cover

Step 12: Franka Control – Brackets

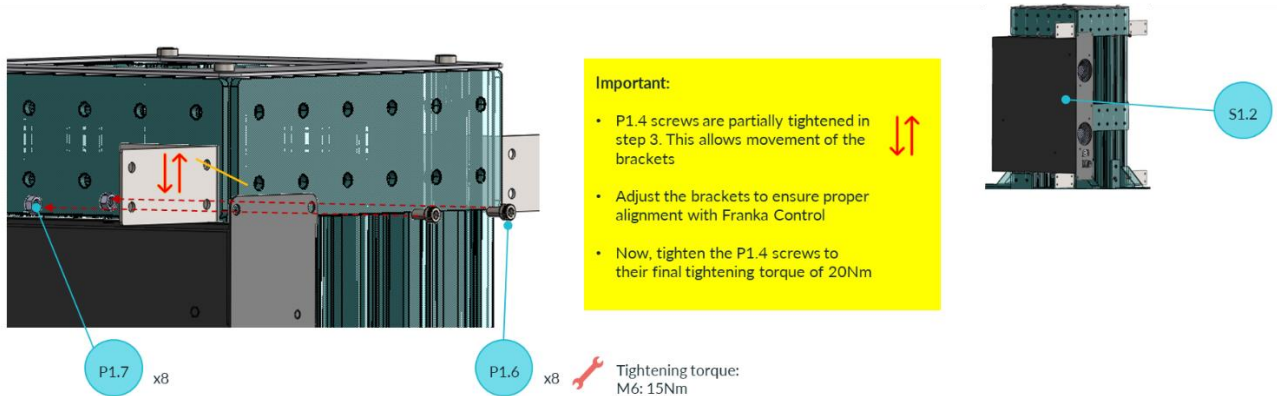


Figure 13: Alignment of brackets P1.6 and P1.7 before final tightening. Adjust brackets while P1.4 screws remain partially loosened; final torque: 15 Nm (M6)

7 FR3 Duo Vision & Manipulation Kit v0.1





FR3 Duo Vision & Manipulation Kit is a collection of vision sensors and manipulation actuators curated by Franka Robotics. It reduces integration efforts and provides a reproducible setup that ensures comparable results across labs.

ID	Components	Preview	Qty	Notes
M1 Grippers Bundle				
M1.1	Robotiq 2F-85 Kit		2x	2-finger gripper kit for UR CB-Series, with RS485 – USB convertor
M1.2	Power Supply		1x	120 W, 24 V, 5A DIN-rail-mount power supply for 2x Robotiq Grippers
M1.3	Cable fixation straps		4x	300mm and 650mm slip-resistant Velcro tape
V1 Head Camera Bundle				
V1.1	ZED Mini Stereo camera		1x	Ultra-depth sensing and motion tracking camera with 1.5m and 4m USB-C to A cable
V1.2	Franka Head Bracket v0.2		1x	Mounting bracket for ZED Mini Camera
V1.2.1	Head Bracket Base		1	Interfaces with FR3 Duo Mount
V1.2.2	Head Bracket Mount		1	Compatible only with ZED Mini Camera
V1.2.3	ISO2338-4x10-h8		2	Alignment Pins
V1.2.4	ISO 4762-M6x30		1	Hexagon socket cap screw
V1.2.5	ISO 4762-M4x12		4	Hexagon socket cap screw
V1.2.6	ISO 4762-M2x8		2x	Hexagon socket cap screw

V1.2.7 ISO 7092 M2x6x0.5



6x Washer

Pos	Components	Preview	Qty	Notes
V2	Wrist Cameras Bundle			
V2.1	D405 RealSense camera		2x	Short-range stereo depth camera
V2.2	Wrist camera mount for Robotiq		2x	Wrist Camera Mount
V2.3	USB 3.0 to Micro B, Male-to-Male, 90 Degree, Up-Angled, 3m		2x	Camera data cable
V2.4	ISO 10642 – M3x6	-	2x	Fasteners D405 to Wrist Camera Mount
V2.5	ISO 4762 – M4x25	-	4x	Fasteners
V2.6	ISO 7089 – M4	-	4x	Washers
V2.7	Cable fixation straps		4x	300mm and 650mm slip-resistant Velcro tape

Tools Needed

- Torque Wrench
- T20 torx bit
- 5 mm Hex Bit
- 3 mm Hex Bit
- 2 mm Hex Bit
- 1.5 mm Hex Bit

NOTICE

The tools listed above are not included in the scope of delivery.

7.1.1 Assembly Instructions: Head Camera Bundle

Step 1: Head Bracket Mount – ZED Mini Camera

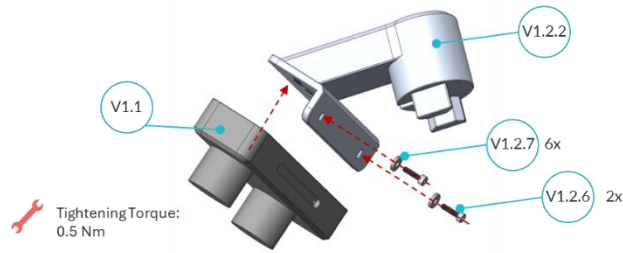


Figure 14: Head Bracket Base to ZED Mini Camera

Step 2: Head Bracket Mount – Head Bracket Base

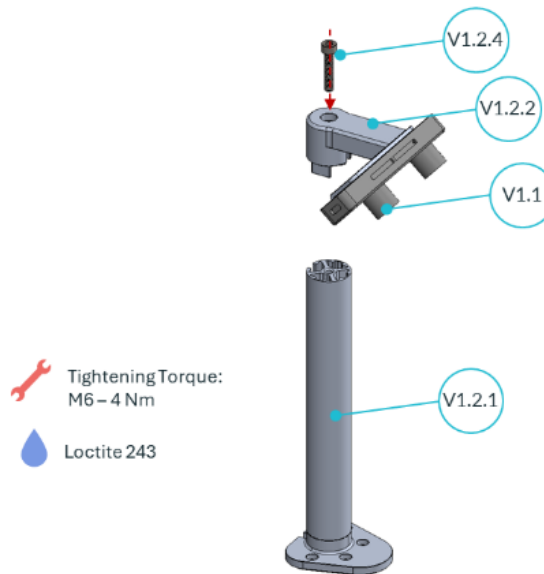


Figure 15: Head Bracket Mount to Head Bracket Base

Step 5: Route the USB-C Cable

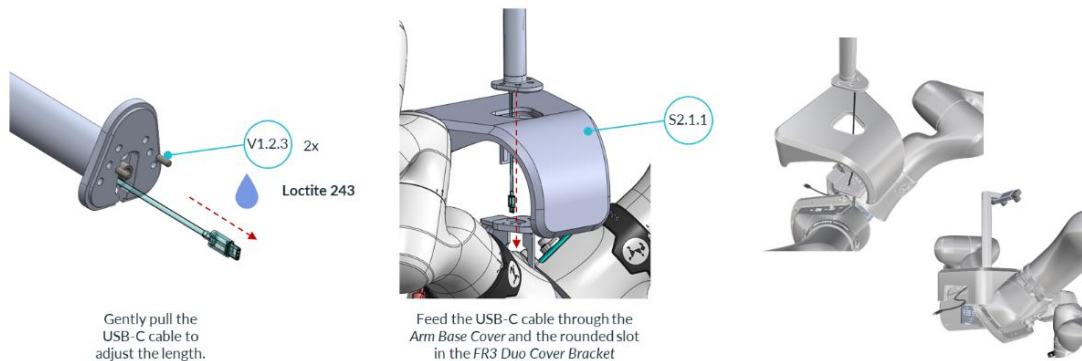


Figure 16: Routing the USB-C cable of ZED Mini Camera

Step 6: Franka Head Bracket – FR3 Duo Mounting Kit

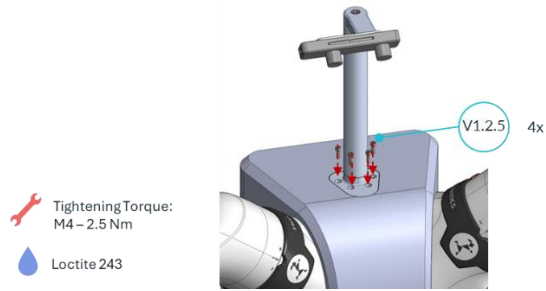


Figure 17: Franka head bracket to FR3 Duo Mounting Kit

7.1.2 Assembly Instructions: Gripper and Wrist Camera Bundle

Step 1: D405 Camera – Wrist Camera Mount



Figure 18: D405 Camera to Wrist Camera Mount

Step 2: Wrist Camera – Robotiq Gripper

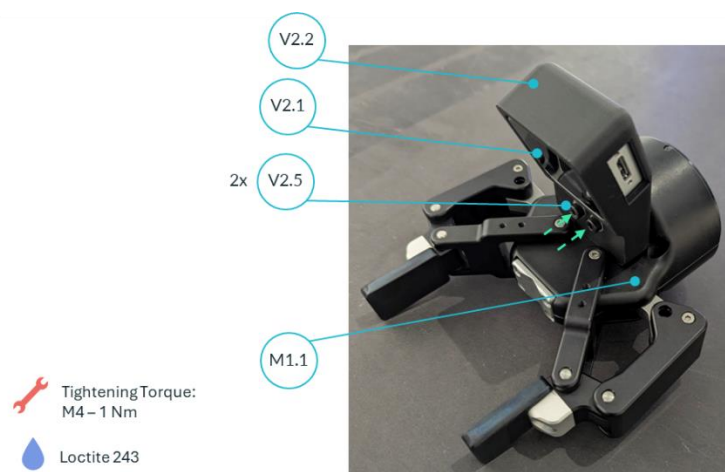


Figure 19: Assembly of components V2.1, V2.2, V2.5, and M1.1 on the gripper. Apply Loctite 243 and tighten M4 screws to 1 Nm.

Step 3: Robotiq Gripper – Franka Arm End-Effector Flange

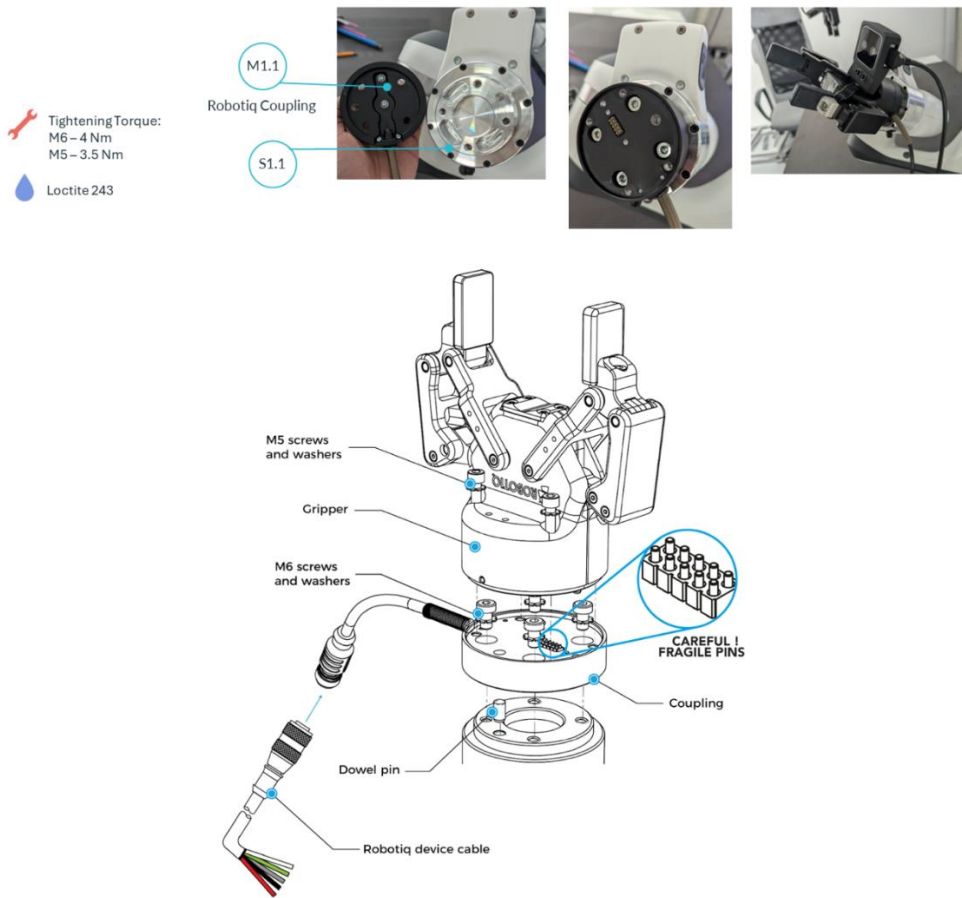


Figure 20: Robotiq Coupling to Franka Arm EE Flange

7.2 Franka Spine

A vertical lift with 1 DOF that enables vertical movement of FR3 Duo. The Franka Spine is currently only compatible with mounting on the Tactile Mobile Robot.

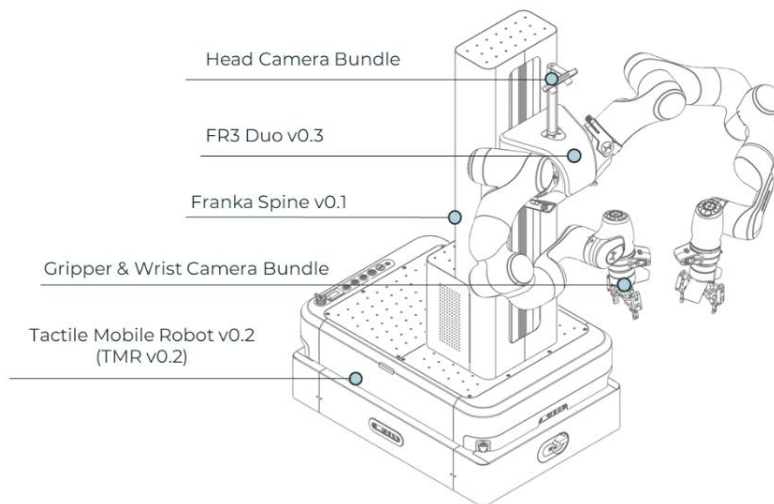


Figure 21: Franka Spine

8 Interface Drawings

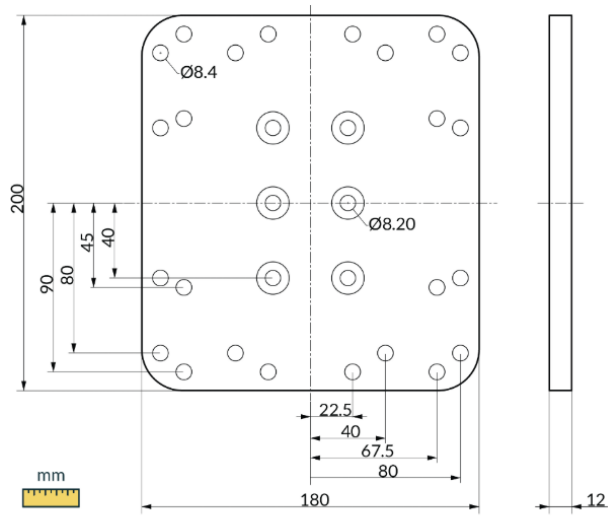


Figure 22: Mounting Plate (P2.1) between pedestal and item profile

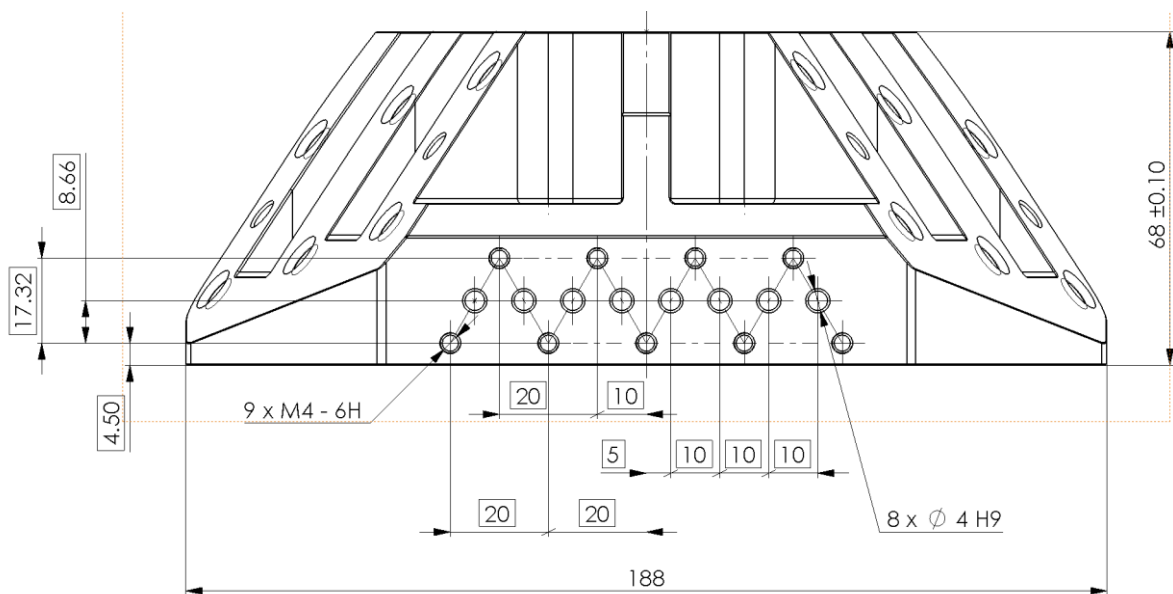


Figure 23: Base Block Duo (S2.2.1) mounting holes

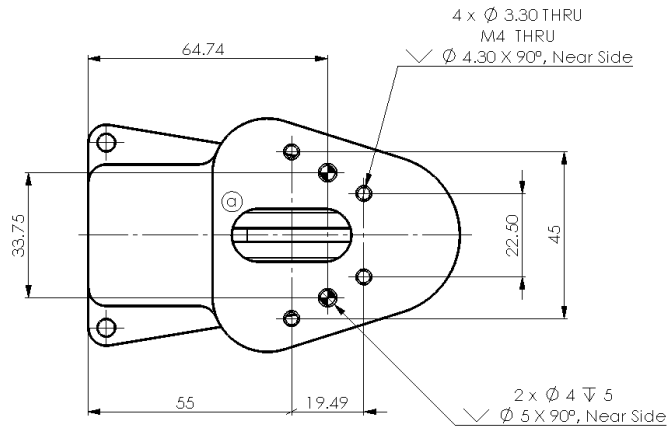


Figure 24: FR3 Duo Cover Bracket (S2.2.3) mounting holes

9 FR3 Duo Franka Reference Kinematics

FR3 Duo kinematics are optimized for:

- Ensuring elbow-to-elbow distance is small enough to traverse doors.
- Overlapping the Yoshikawa manipulability space of both arms
- Maximizing reachability on a table-top surface, considering FR3 Duo's Origin at 200 mm above the worksurface.

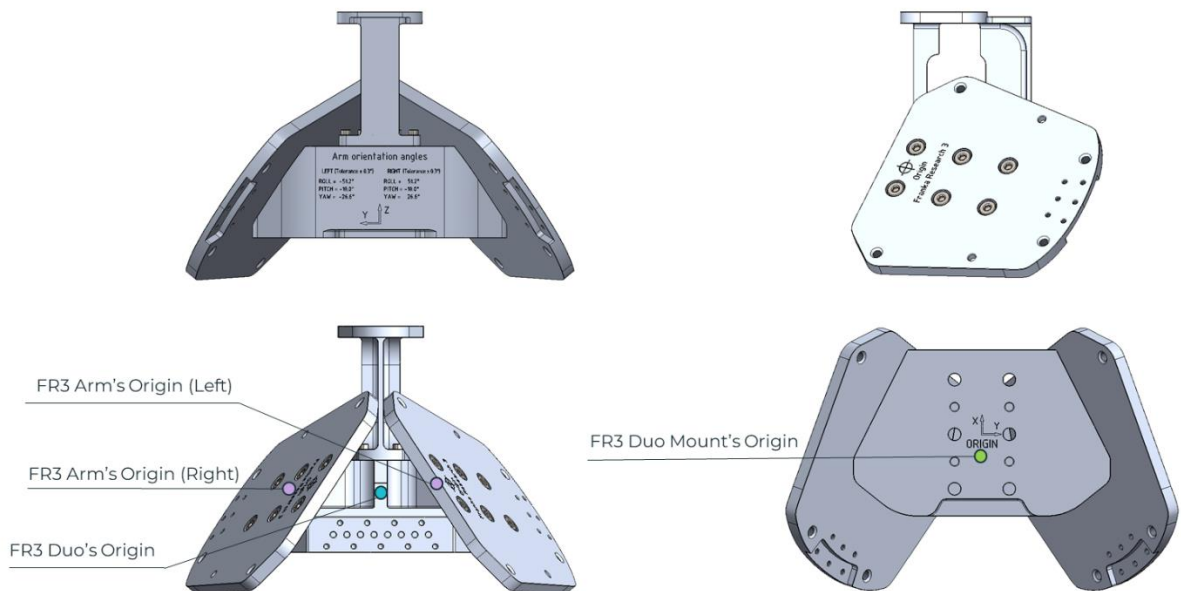


Figure 25: Difference between FR3 Arm's Origin, FR3 Duo's Origin, and FR3 Duo Mount's Origin

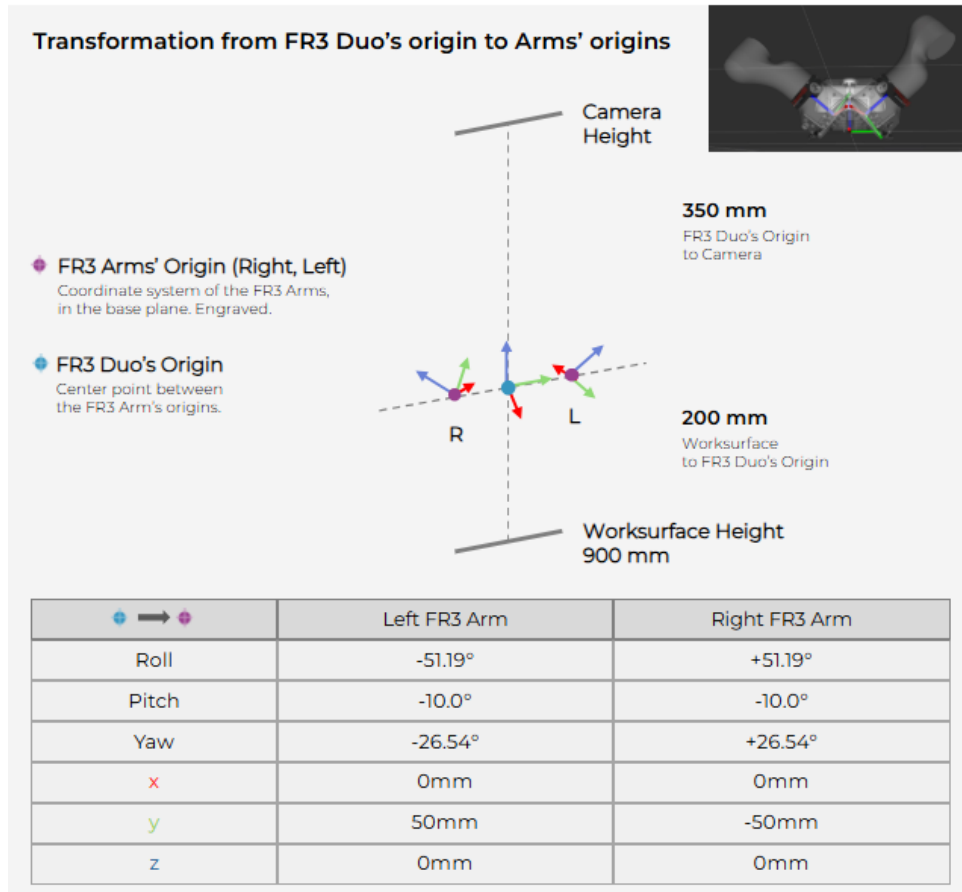


Figure 26: Transformation from FR3 Duo origin to the individual arm origins

As the origin of FR3 Duo is not easily accessible, a reference point is engraved at the bottom of FR3 Duo Mount that is easy to identify and measure from.

For FR3 Duo Mount v0.3, this reference point is located 50 mm below (z) and 37 mm along the negative x-direction relative to FR3 Duo origin.

From this reference point, visible at the bottom of FR3 Duo Mount v0.3:

- Ensure the worksurface is 150 mm below
- Ensure the camera is 400 mm above.
- Ensure the camera is 53 mm forward.

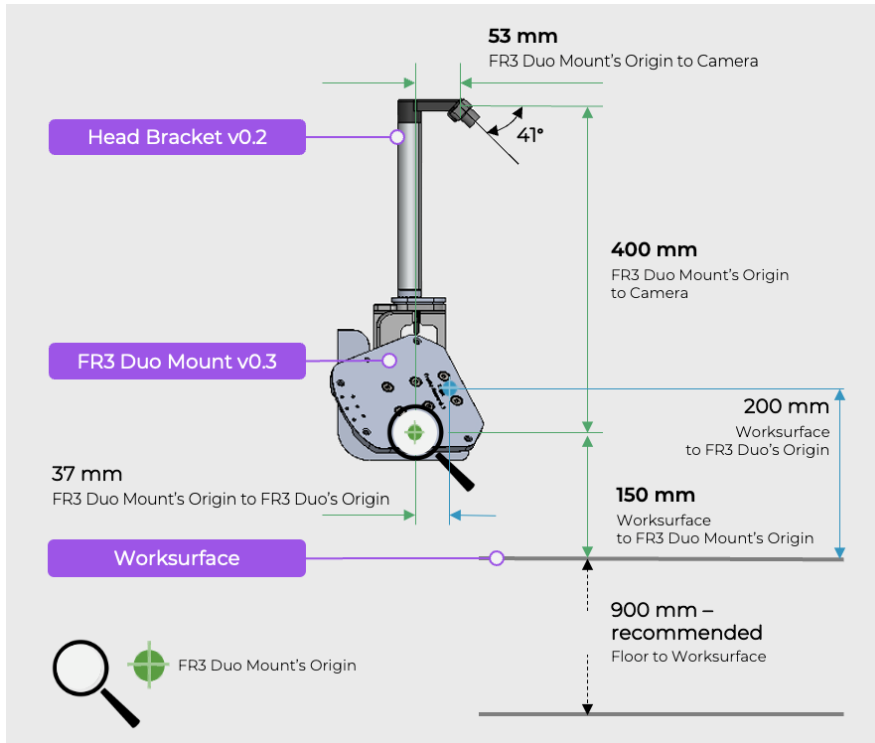


Figure 27: FR3 Duo Mount geometry and vertical reference dimensions

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