FRANKA ROBOTICS


# FRANKA RESEARCH 3

## Datasheet

# Datasheet[1]
# Arm & Control

## ARM

| | |
|---|---|
| Degrees of freedom | 7 |
| Payload | 3 kg |
| Maximum reach | 855 mm |
| Force/Torque sensing | link-side torque sensor in all 7 axes |
| Joint position limits | A1, A3: -166/166 deg<br>A2: -105/105 deg<br>A4: -176/-7 deg<br>A5: -165/165 deg<br>A6: 25/265 deg<br>A7: -175/175 deg |
| Joint torque limits | A1-A4: ±87 Nm<br>A5-A7: ±12 Nm |
| Mounting flange | DIN ISO 9409-1-A50 |
| Installation position | upright |
| Weight | ~ 17.8 kg |
| Protection rating | IP40 |
| Ambient temperature [2] | +5 °C to +45 °C |
| Air humidity | 20 – 80 % non-condensing |

| | |
|---|---|
| Interfaces | • ethernet (TCP/IP) for visual intuitive programming with Desk<br>• safety-rated input for external enabling device<br>• 2 configurable safety-rated inputs for emergency stop devices, safeguards or other protective devices (OSSD devices via external OSSD converter connectable)<br>• hardware prepared for: 2x DI & 2x DO (24V, isolated, EN 61131-2 type 3 characteristics, 100 Hz sampling rate)<br>• Control connector<br>• connector for end effector |
| User Interfaces at the Arm's Pilot Grip | • integrated safety-rated guiding enabling switch<br>• guiding button<br>• guiding mode selector |
| User Interfaces at the Arm's Pilot Disc | • status light<br>• Pilot mode selector<br>• arrow keys, teach, confirm, delete |

## CONTROL

| | |
|---|---|
| Controller size (19") | 355 x 483 x 89 mm (D x W x H) |
| Supply voltage | 100 – 240 $V_{AC}$ |
| Mains frequency | 50– 60 Hz |
| Power consumption | ~ 80 W |
| Active power factor correction (PFC) | yes |
| Weight | ~ 7 kg |
| Protection rating | IP20 |
| Ambient temperature [2] | +5 °C to +45 °C |
| Air humidity | 20 – 80 % non-condensing |
| Permitted mounting orientation | horizontal |
| Interfaces | • ethernet (TCP/IP) for internet and/or shop-floor connection<br>• power connector IEC 60320C14 (V-Lock)<br>• Arm connector |

## EXCLUSIVE

| | |
|---|---|
| Research interface | 1kHz Franka Control Interface (FCI) |

## PERFORMANCE

| | |
|---|---|
| **Motion** | |
| Joint velocity limits | A1-A4: 150 °/s<br>A5-A7: 301 °/s (at FCI use A6: 239 °/s) |
| Cartesian velocity limits | up to 2 m/s end effector speed |
| Pose repeatability [3] | <+/- 0.1 mm (ISO 9283) |
| **Interaction** | |
| Guiding force | ~ 2.5 N |
| Adjustable translational stiffness | 10 – 3000 N/m |
| Adjustable rotational stiffness | 1 – 300 Nm/rad |
| Monitored signals | joint position, velocity, torque cartesian position, force |

## ADD-ONS

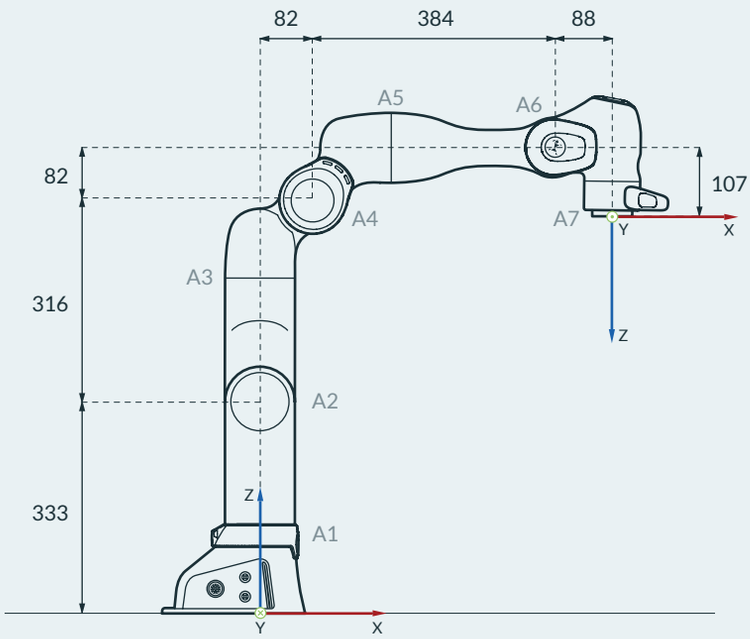
| | |
|---|---|
| Fully integrated end effectors | • 2-finger gripper<br>• Vacuum gripper |
| Fieldbuses | • Modbus/TCP<br>• OPC UA |

## SAFETY

| | |
|---|---|
| **Certification** | |
| EN ISO 13849-1:2015 safety of machinery - safety-related parts of control systems | certified by TÜV SÜD RAIL |
| EN ISO 10218-1:2011 Robots and robotic devices - safety requirements for industrial robots Part1: Robots | certified by TÜV SÜD Product Service |
| **Collaborative operation modes** | |
| Safety-rated monitored stop | fully integrated in PL d Cat. 3 |
| Hand-guiding | fully integrated in PL d Cat. 3 |
| Safety-rated speed and separation monitoring | realizable in combination with external protective devices up to PL d Cat. 3 |
| **Safety parametrization & validation** | |
| Watchman | user interface to set and validate safety-related parameters |
| User management | role based access management |
| **Safety Functions** | |
| Emergency Stop (X3.1) | PL d / Cat. 3 |
| External Enabling Device (X4) | PL d / Cat. 3 |
| Enabling Button | PL d / Cat. 3 |
| Two configurable safe inputs (X3.2 and X3.3) | PL d / Cat. 3 |
| SLP-C: Safely limited Cartesian position | PL d / Cat. 3 note: FCI cannot control the robot while SLP-C is active |
| SLS-C: Safely limited Cartesian speed | PL d / Cat. 3 note: FCI cannot control the robot while SLS-C is active |
| SLP-J: Safely limited joint angle | PL d / Cat. 3 note: FCI cannot control the robot while SLP-J is active |
| SLS-J: Safely limited joint speed | PL d / Cat. 3 |
| SLD: Safely limited distance | PL d / Cat. 3 |
| SEEPO: Safe End Effector Power off | PL b / Cat. b |
| **Stopping Functions** | |
| Category 0 stop | PL d / Cat. 3 |
| Category 1 stop | PL d / Cat. 3 |
| Category 2 stop | PL d / Cat. 3 |
| Worst case safe Cartesian position accuracy for stopping functions | 50 mm |
| **Safety values according to EN ISO 13849-1** | |
| PFH of PL d / Cat. 3 safety functions (Probability of Failures per Hour) | < 1 × 10−7 |
| PFH of PL b / Cat. b safety functions (Probability of Failures per Hour) | < 1 × 10−7 |

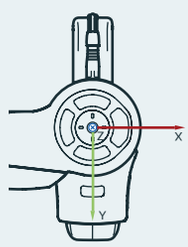
1. Technical data are subject to change.
2. For more details see Product Manual Franka Production 3.
3. Based on ISO 9283 (Annex A), specified values refer to a workspace of 0.4 x 0.4 x 0.4 m centered at [0.498, 0.0, 0.226] m, with the Z-Axis of the flange oriented parallel to earth-gravity and the elbow positioned upwards.

## DIMENSIONS & WORKSPACE

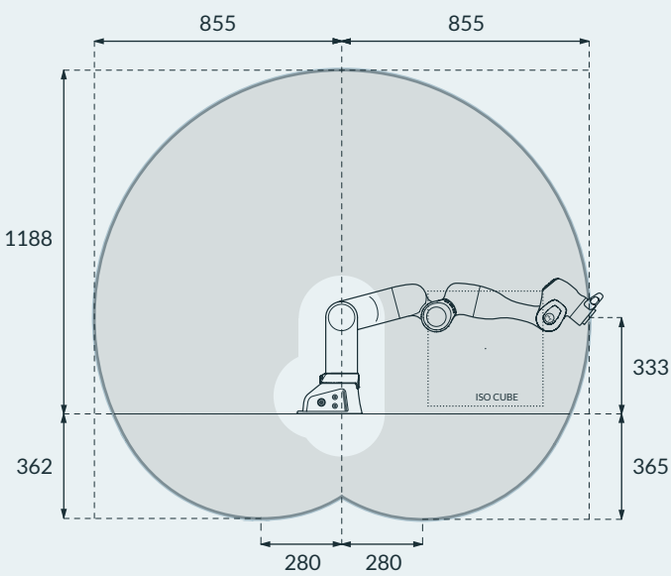



Axes names with link distances [mm]

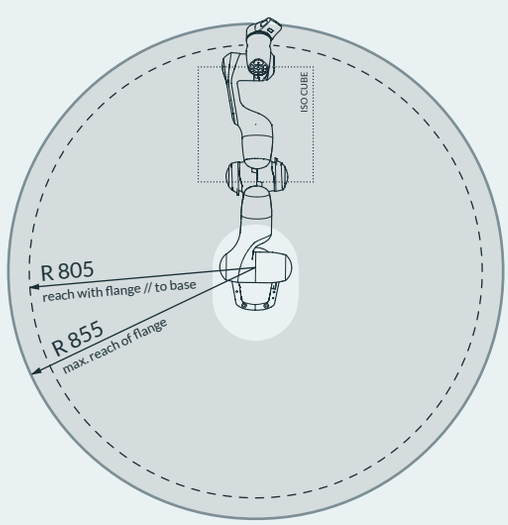

Alignment axes 7 without end effector




Alignment axes 7 with Franka Hand




Workspace | side view [mm]




Workspace | top view [mm]