



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 A2: -105/105 deg A4: -176/-7 deg A5: -165/165 deg A6: 25/265 deg A7: -175/175 deg |
| 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 | <ul style="list-style-type: none"> • ethernet (TCP/IP) for visual intuitive programming with Desk • safety-rated input for external enabling device • 2 configurable safety-rated inputs for emergency stop devices, safeguards or other protective devices (OSSD devices via external OSSD converter connectable) • hardware prepared for: 2x DI & 2x DO (24V, isolated, EN 61131-2 type 3 characteristics, 100 Hz sampling rate) • Control connector • connector for end effector |
| User Interfaces at the Arm's Pilot Grip | <ul style="list-style-type: none"> • integrated safety-rated guiding enabling switch • guiding button • guiding mode selector |
| User Interfaces at the Arm's Pilot Disc | <ul style="list-style-type: none"> • status light • Pilot mode selector • arrow keys, teach, confirm, delete |
| CONTROL | PERFORMANCE |
| 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 | <ul style="list-style-type: none"> • ethernet (TCP/IP) for internet and/or shop-floor connection • power connector IEC 60320C14 (V-Lock) • Arm connector |
| Motion | |
| Joint velocity limits | A1-A4: 150 °/s A5-A7: 301 °/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 | <ul style="list-style-type: none"> • 2-finger gripper • Vacuum gripper |
| Fieldbuses | <ul style="list-style-type: none"> • Modbus/TCP • OPC UA |
| EXCLUSIVE | |
| Research interface | 1kHz Franka Control Interface (FCI) |

SAFETY

Certification

| | |
|---|---------------------------|
| EN ISO 13849-1:2015 safety of machinery - safety-related parts of control systems | certified by TÜV SÜD RAIL |
|---|---------------------------|

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

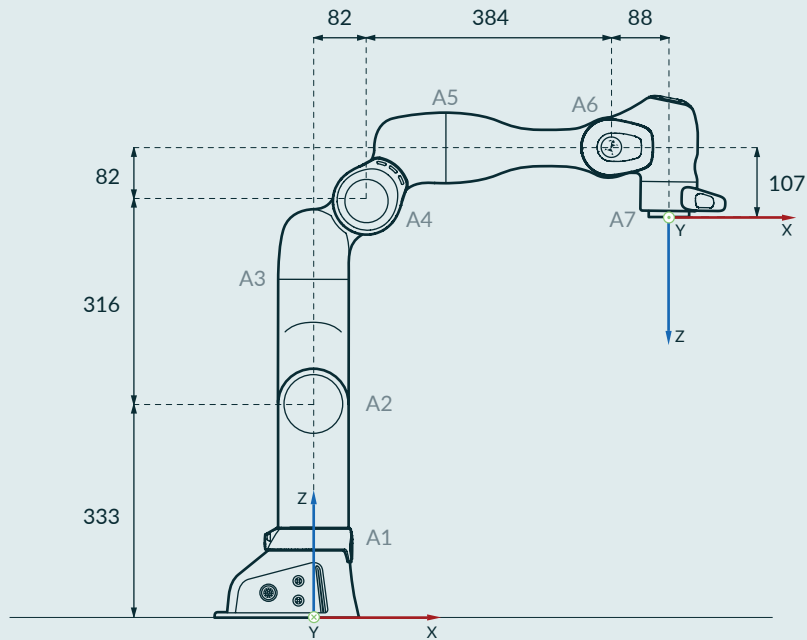
| | |
|--|---------------|
| Category 0 stop | PL d / Cat. 3 |
| Category 1 stop | PL d / Cat. 3 |
| Category 2 stop | PL d / Cat. 3 |
| Worst case safe Cartesian position accuracy for stopping functions | 50 mm |

Safety values according to EN ISO 13849-1

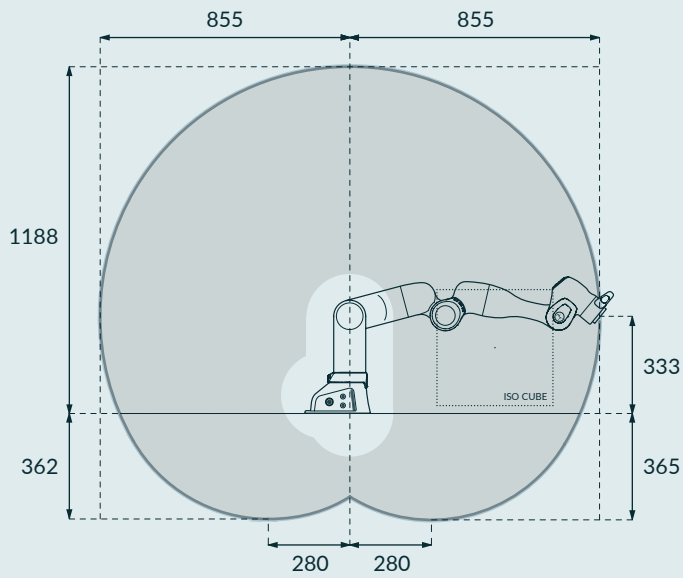
| | |
|---|----------------------|
| PFH of PL d / Cat. 3 safety functions (Probability of Failures per Hour) | $< 1 \times 10^{-7}$ |
| PFH of PL b / Cat. b safety functions (Probability of Failures per Hour) | $< 1 \times 10^{-7}$ |

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.

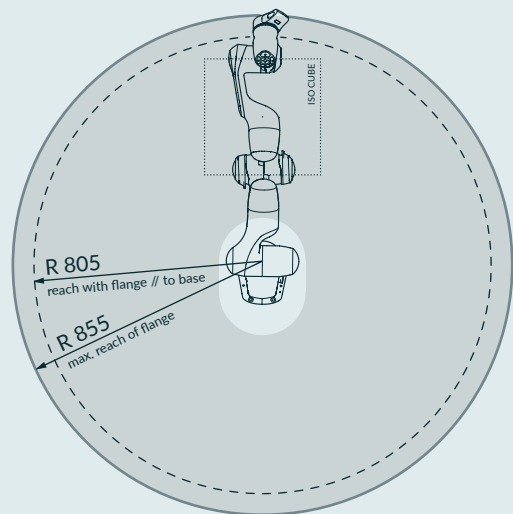
DIMENSIONS & WORKSPACE



Axes names with joint lengths [mm]



Workspace | side view [mm]



Workspace | top view [mm]