## HARDWARE

### Arm
- Degrees of freedom: 7
- Payload: 3 kg
- Workspace: see backside
- Maximum reach: 855 mm
- F/T Sensing: link-side torque sensors in all 7 axes
- Joint position limits: A1, A3, A5, A7: 166/166
  - A2: 101/101
  - A4: 176/-4
  - A6: 1/215
- Mounting flange: DIN ISO 9409-1-A50
- Installation position: upright
- Moving mass: 12.8 kg
- Protection rating: IP30
- Ambient temperature: 15 – 25 °C (typical)
  - 5 – 45 °C (extended)
- Air humidity: 20 – 80 % non-condensing

### Interfaces
- ethernet (TCP/IP) for visual intuitive programming with Desk
- input for external enabling device
- input for external activation device or safeguard
- Control connector
- Connector for end-of-arm tooling

### Control
- Controller size (19”): 355 x 483 x 89 mm (D x W x H)
- Supply voltage: 100 – 240 V~
- Mains frequency: 47 – 63 Hz
- Power consumption:
  - max. 600 W
  - average ~ 300 W
- Active power factor correction (PFC): yes
- Weight: 7 kg
- Protection rating: IP20
- Ambient temperature: 15 – 25 °C (typical)
  - 5 – 45 °C (extended)
- Air humidity: 20 – 80 % non-condensing

### Interfaces
- ethernet (TCP/IP) for internet and/or shop-floor connection
- power connector IEC 60320-C14 (V-Lock)
- Arm connector

## SOFT-ROBOT PERFORMANCE

### Motion
- Joint velocity limits [°/s]: A1, A2, A3, A4: 150
  - A5, A6, A7: 180
- Cartesian velocity limits: up to 2 m/s end effector speed
- Pose repeatability: +/- 0.1 mm (ISO 9283)
- Path deviation: +/- 1.25 mm

### Force
- Force resolution: <0.05 N
- Relative force accuracy: 0.8 N
- Force repeatability: <0.05 N
- Force noise (RMS): <0.035 N
- Torque resolution: <0.02 Nm
- Relative torque accuracy: 0.15 Nm
- Torque repeatability: <0.05 Nm
- Torque noise (RMS): <0.055 Nm

### 1 kHz Control
- Minimum controllable force (Fz): 0.05 N
- Force controller bandwidth (-3 dB): 10 Hz

### Force range
- [N]:
  - Nominal case
  - Best case
  - Fx: -125 – 95
    - -150 – 115
  - Fy: -98 – 98
    - -270 – 270
  - Fz: -50 – 150
    - -115 – 155
- Torque range [Nm]:
  - Nominal case
  - Best case
  - Mx: -10 – 10
    - -70 – 65
  - My: -10 – 10
    - -11 – 11
  - Mz: -10 – 10
    - -11 – 11

### Interaction
- Guiding force: ~ 2 N
- Collision detection time: <2 ms
- Nominal collision reaction time: <50 ms
- Worst case collision reaction time: <100 ms
- Translational compliance / stiffness: 0 – 3000 N/m
- Rotational compliance / stiffness: 0 – 300 Nm/rad
- Monitored signals: Joint position, velocity, torque
- Cartesian position, velocity, force

### ADD-ONS
- Retrofit option with safety-rated PLC
  - Pld Cat. 3
  - Safe torque off (STO)
  - Safe OSSD inputs
- Fully integrated end effectors
  - 2-finger gripper
  - Vacuum gripper
- Fast mounting
  - Panda Paw
- Travelling case
  - Panda Case
- Research interface
  - 1kHz Franka Control Interface
1. Technical data are subject to change.
2. Lifetime and performance can potentially be reduced when operating outside the typical temperature range.
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 [0.515, 0.0, 0.226] m, with the Z-Axis of the flange oriented parallel to earth-gravity and the elbow positioned upwards.
4. Nominal conditions (66% load).
5. Additional FCI license necessary.