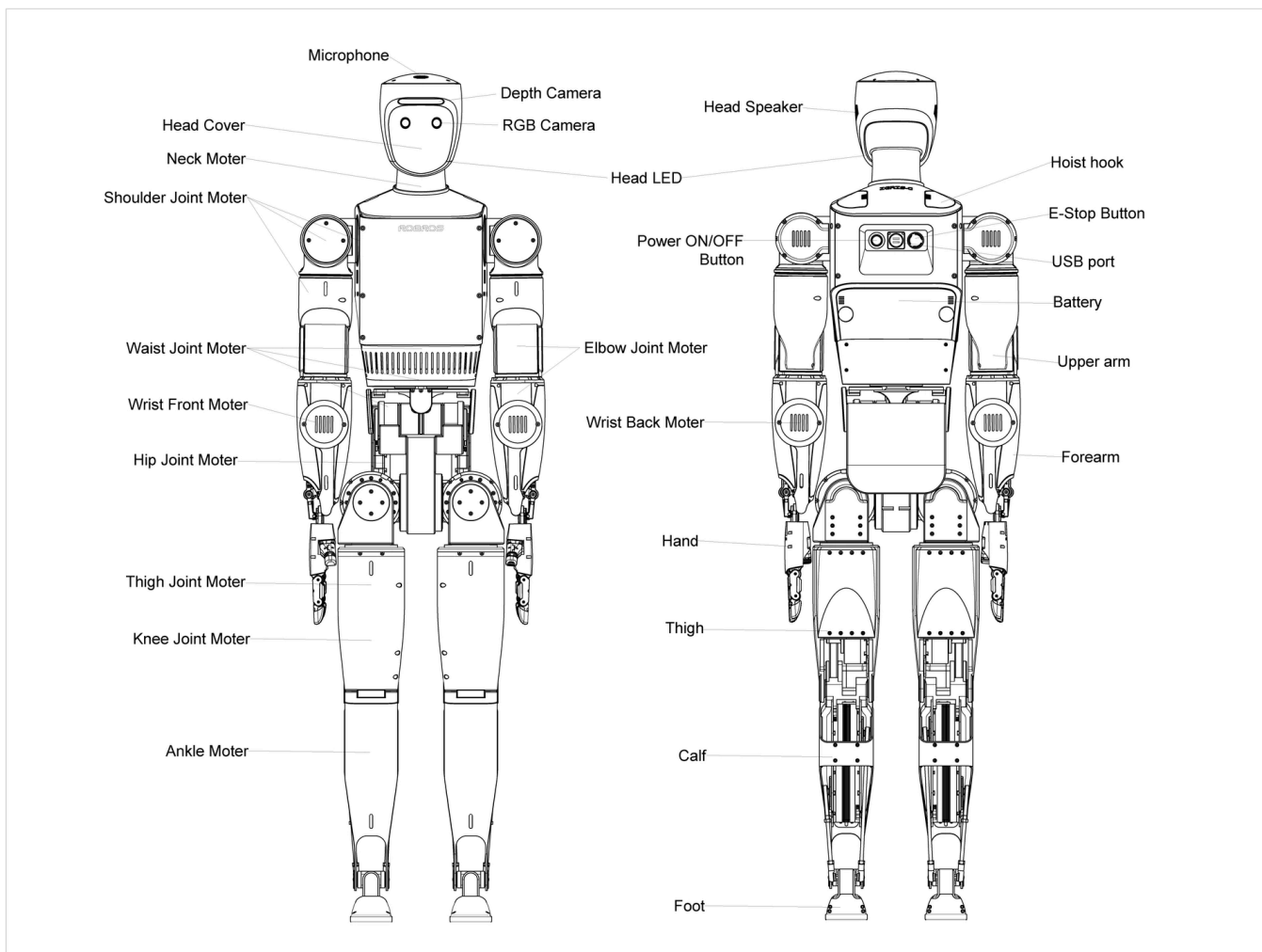


Overview & Components

1. Product Overview

- **IGRIS-C** is a humanoid robot with a height of **154 cm** and a gender-neutral form factor, developed for use in a wide range of experimental and practical environments.
- The rear of the robot features a **Power Button** (left) and an **EMO (Emergency Off)** switch (right).
- A **Head Indicator (LED)** is mounted beneath the robot's head for status indication.



2. Key Specifications

Item	Specification
Model	IGRIS-C
Dimensions	1540 × 440 × 300 mm
Height	154 cm
Weight	60 kg
Total Degrees of Freedom	53 DoF (Legs 6DoF ×2, Arms 7DoF ×2, Waist 3DoF, Neck 2DoF, Hands 11DoF ×2)
Hand Degrees of Freedom	11 DoF (6 Active DoF + 5 Passive DoF)
Number of Fingers	5
Maximum Joint Torque	150 Nm
Maximum Payload	6 kg (using both arms)
Battery	17,000 mAh / 48V
Computing System	Intel Core i7

3. Standard Package Contents

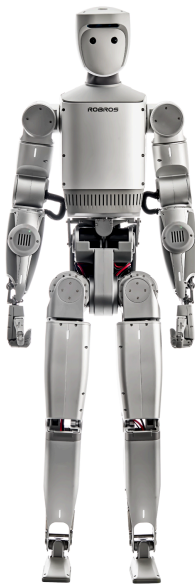
1. Packaging Box

- Humanoid Robot (IGRIS-C)
- Power Supply Unit
- Battery
- Battery Charger
- EMO Remote Controller (23A Battery, 12V)

2. Master Arm

3. Application Software

*Hoist sold separately.



Humanoid



Master arm



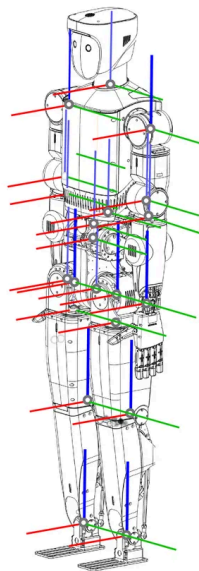
EMO Remote

4. Sensors

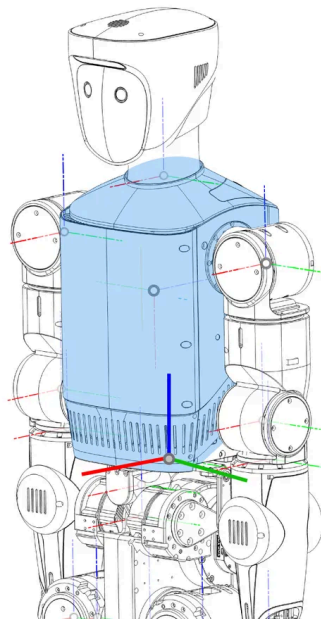
- Depth Camera (<https://realsenseai.com/products/depth-camera-d435i/>)
- RGB Stereo Camera
- IMU
- RGB Camera (5-Finger Hand or 1-DoF Gripper)

Specs (Links)

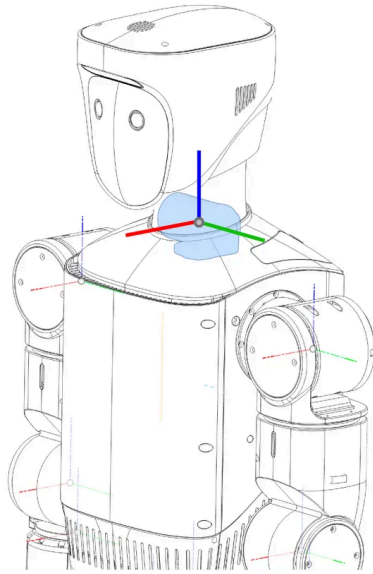
TOTAL LINKS: 32



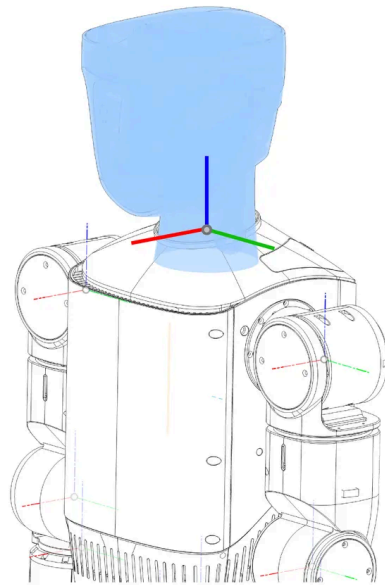
1. TORSO (BASE)



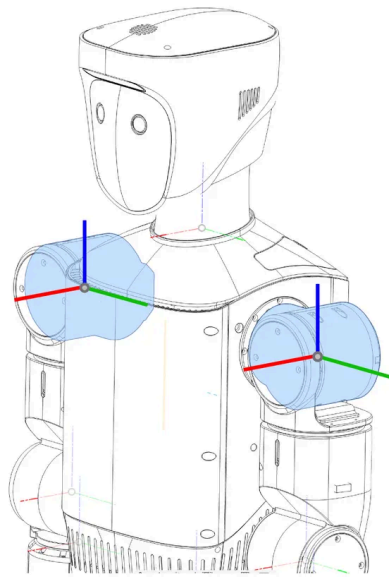
2. NECK_YAW



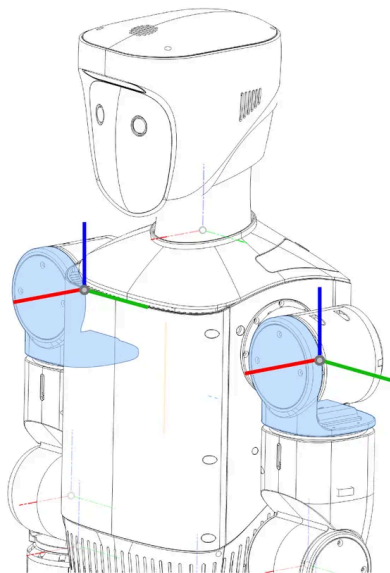
3. NECK_PITCH



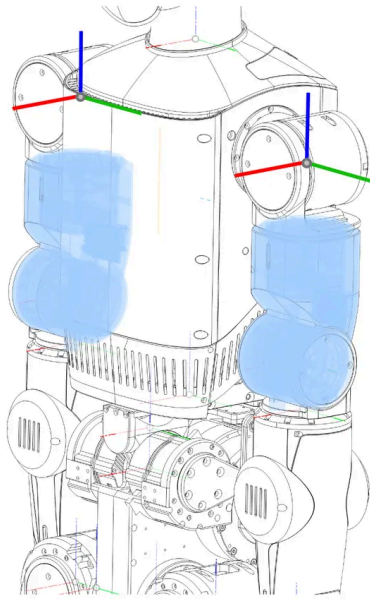
4. SHOULDER_PITCH_R & SHOULDER_PITCH_L



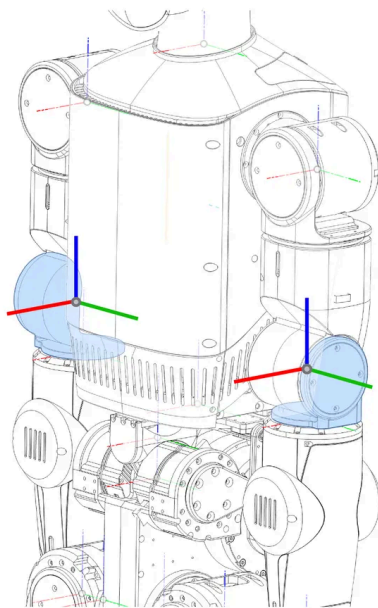
5. SHOULDER_ROLL_R & SHOULDER_ROLL_L



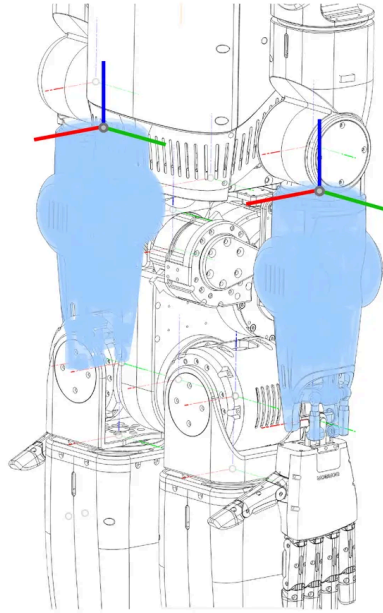
6. SHOULDER_YAW_R & SHOULDER_YAW_L



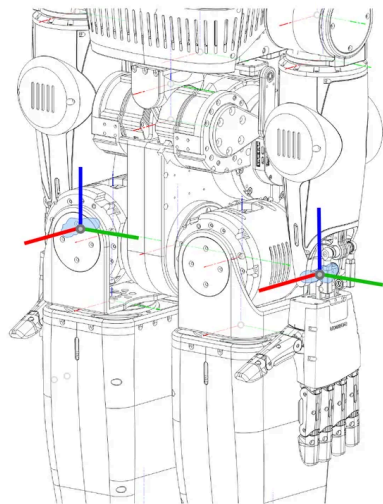
7. ELBOW_PITCH_R & ELBOW_PITCH_L



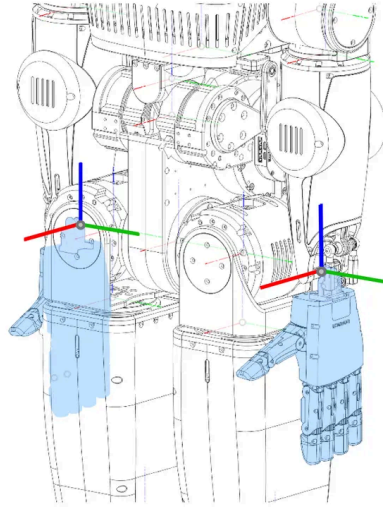
8. ELBOW_YAW_R & ELBOW_YAW_L



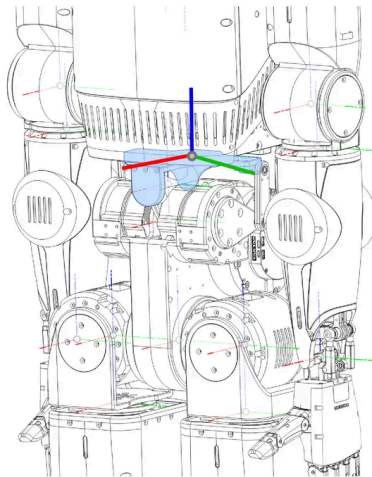
9. WRIST_ROLL_R & WRIST_ROLL_L



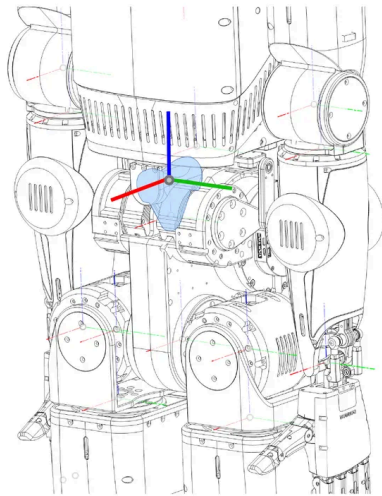
10. WRIST_PITCH_R & WRIST_PITCH_L



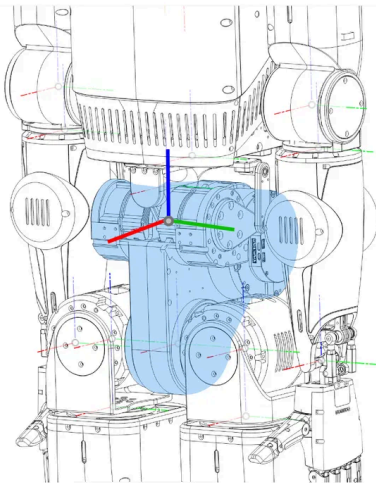
11. WAIST_YAW



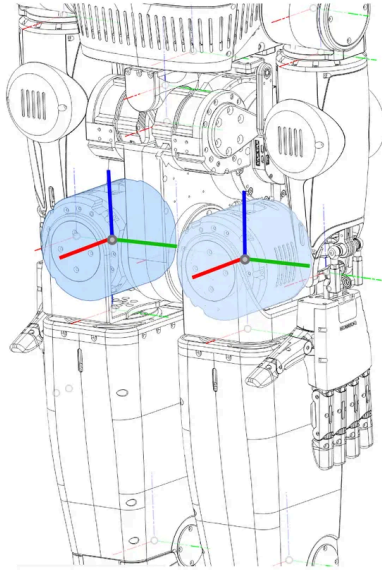
12. WAIST_ROLL



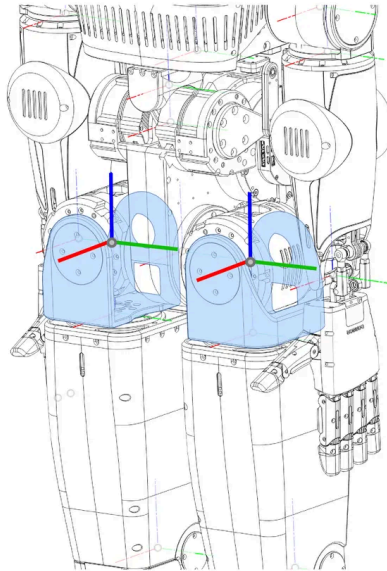
13. WAIST_PITCH



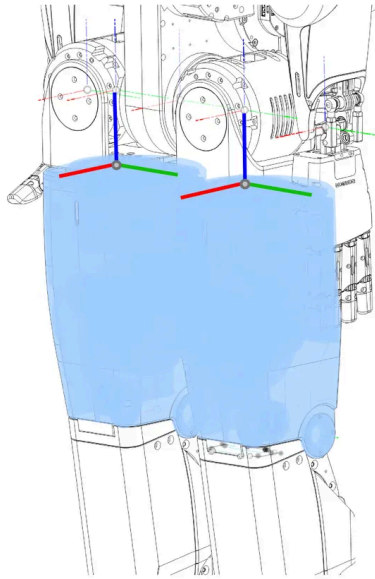
14. HIP_PITCH_R & HIP_PITCH_L



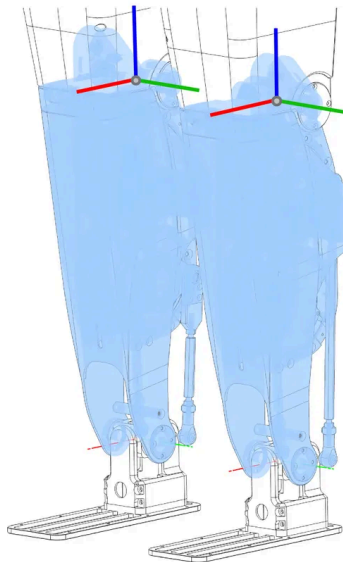
15. HIP_ROLL_R & HIP_ROLL_L



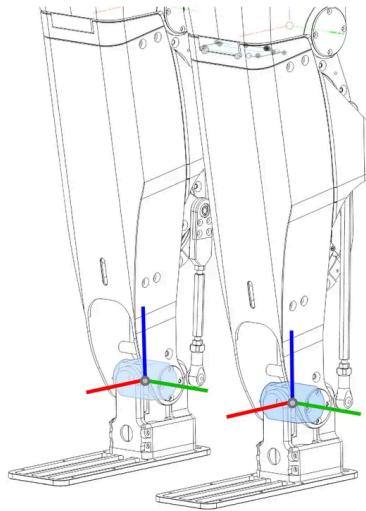
16. HIP_YAW_R & HIP_YAW_L



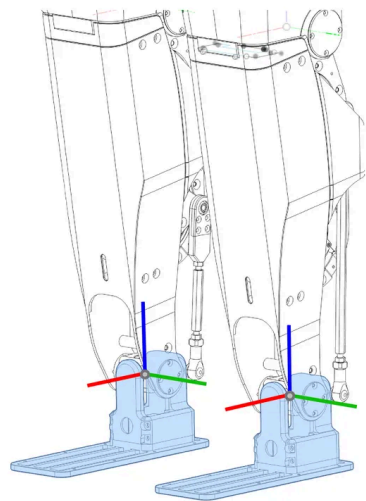
17. KNEE_PITCH_R & KNEE_PITCH_L



18. ANKLE_PITCH_R & ANKLE_PITCH_L

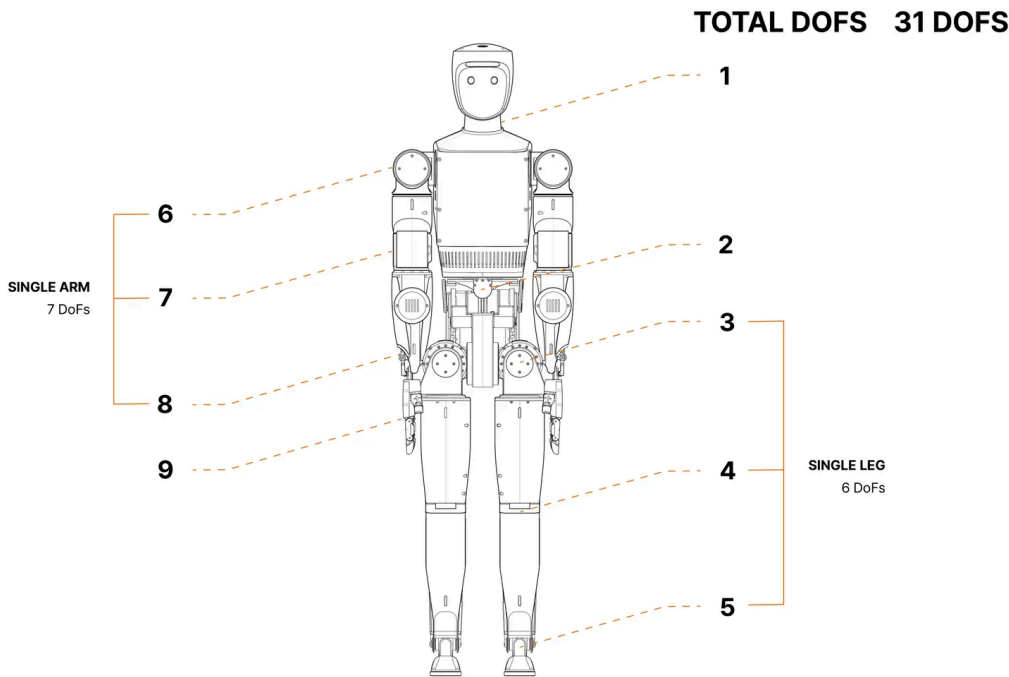


19. ANKLE_ROLL_R & ANKLE_ROLL_L



Specs (DoF)

DEGREES OF FREEDOM



- 1**
Neck
2 DoFs
- 2**
Waist Joint
3 DoFs
- 3**
Single Hip Joint
3 DoFs
- 4**
Single Knee
1 DoFs
- 5**
Single Ankle
2 DoFs
- 6**
Single Shoulder
3 DoFs
- 7**
Single Elbow
1 DoFs
- 8**
Single Wrist
3 DoFs
- 9**
Single Hand
6 DoFs

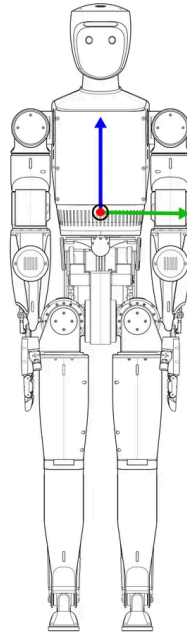
병렬 링크 구조를 갖는 관절(허리, 발목, 손목)의 경우, roll과 pitch 축이 서로 기구적으로 연동(coupling)되어 있다. 본 문서에 표기된 가동 범위는 coupling된 다른 축이 0°일 때를 기준으로 정의된다.

IGRIS의 고정 축 기준 정리

모든 링크 프레임에 동일 기준 적용이 된다.

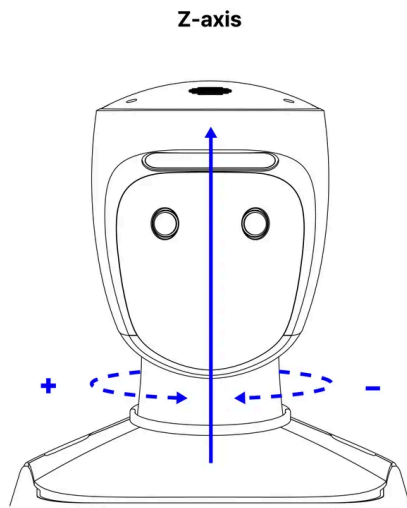
차렷 자세에서:

- Left = y축
- Front = x축
- Top = z축



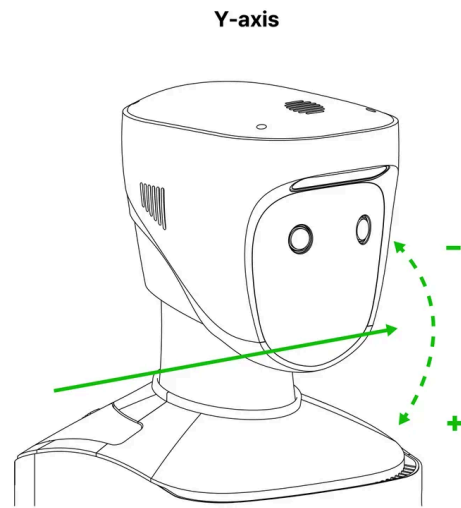
1. NECK 2 DOFS

JOINT	AXIS	MIN (°)	MAX (°)
NECK_YAW	Z	-70	70
NECK_PITCH	Y	-30	30



NECK_YAW

Range: $\pm 70^\circ$

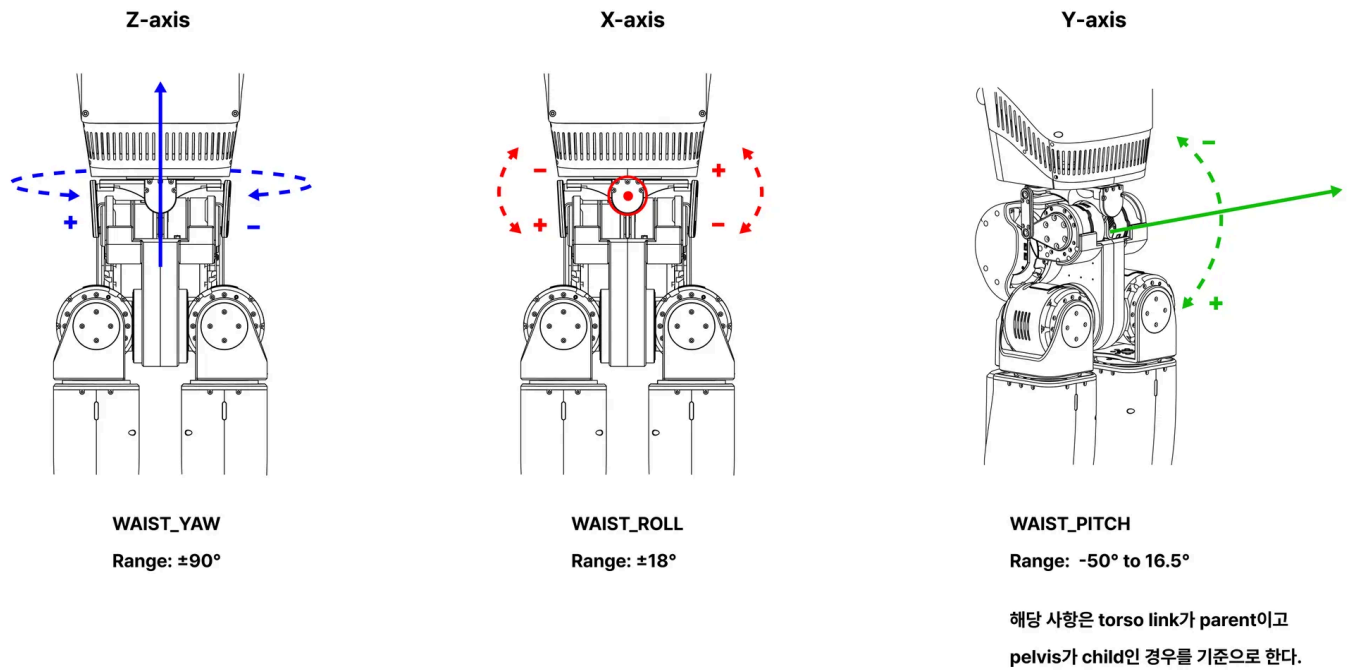


NECK_PITCH

Range: $\pm 30^\circ$

2. WAIST 3 DOFS

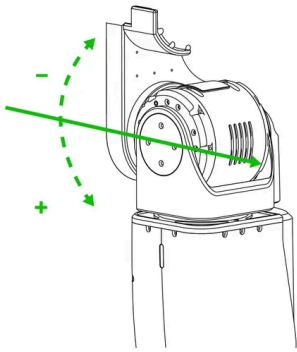
JOINT	AXIS	MIN ($^\circ$)	MAX ($^\circ$)
WAIST_YAW	Z	-90	90
WAIST_ROLL	X	-18	18
WAIST_PITCH	Y	-50	16.5



3. LEFT LEG 6 DOFS

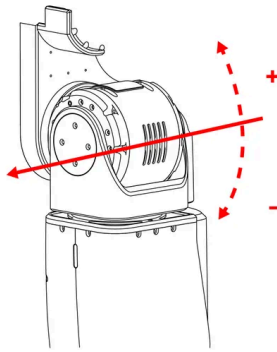
JOINT	AXIS	MIN ($^\circ$)	MAX ($^\circ$)
HIP_PITCH_L	Y	-118	30
HIP_ROLL_L	X	-19	135
HIP_YAW_L	Z	-90	90
KNEE_PITCH_L	Y	0	131
ANKLE_PITCH_L	Y	-42	41
ANKLE_ROLL_L	X	-20	20

Y-axis



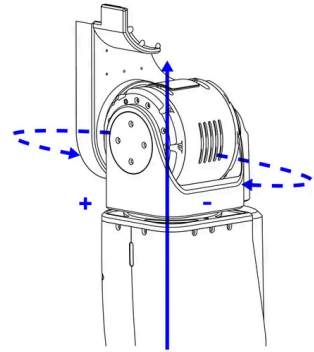
HIP_PITCH_L
Range: -118° to +30°

X-axis



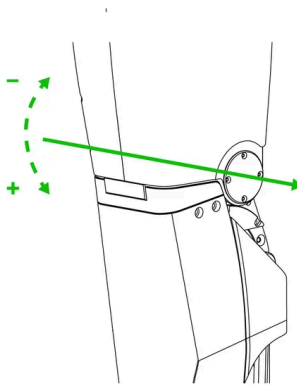
HIP_ROLL_L
Range: -19° to +135°

Z-axis



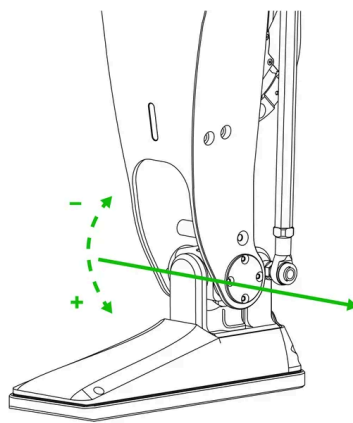
HIP_YAW_L
Range: ±90°

Y-axis



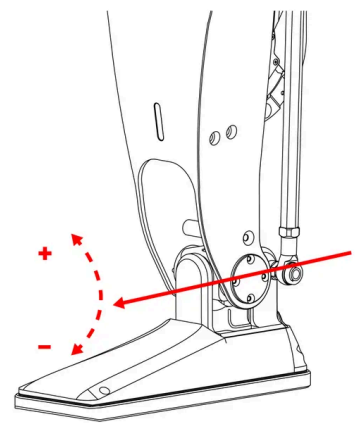
KNEE_PITCH_L
Range: 0° to 131°

Y-axis



ANKLE_PITCH_L
Range: -42° to 41°

X-axis

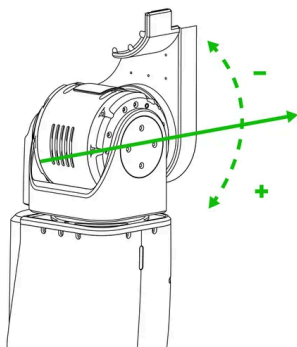


ANKLE_ROLL_L
Range: -20° to +20°

4. RIGHT LEG 6 DOFS

JOINT	AXIS	MIN (°)	MAX (°)
HIP_PITCH_R	Y	-118	30
HIP_ROLL_R	X	-135	19
HIP_YAW_R	Z	-118	30
KNEE_PITCH_R	Y	0	131
ANKLE_PITCH_R	Y	-42	41
ANKLE_ROLL_R	X	-20	20

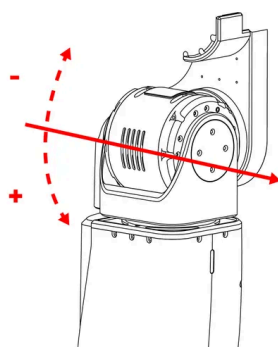
Y-axis



HIP_PITCH_R

Range: -118° to +30°

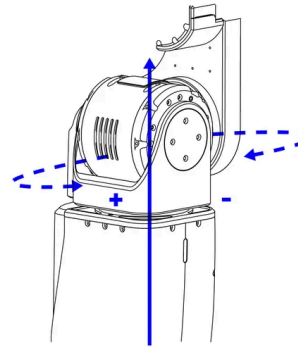
X-axis



HIP_ROLL_R

Range: -135° to +19°

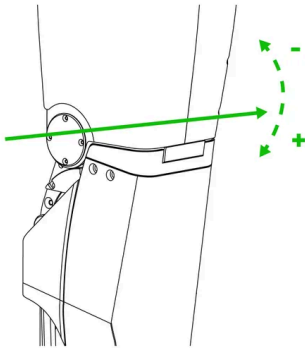
Z-axis



HIP_YAW_R

Range: ±90°

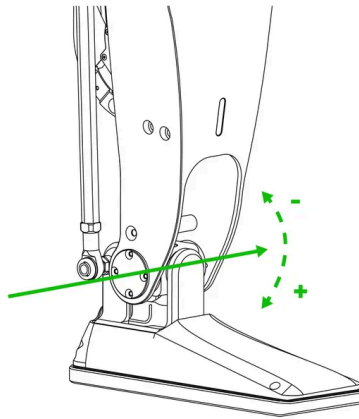
Y-axis



KNEE_PITCH_R

Range: 0° to 131°

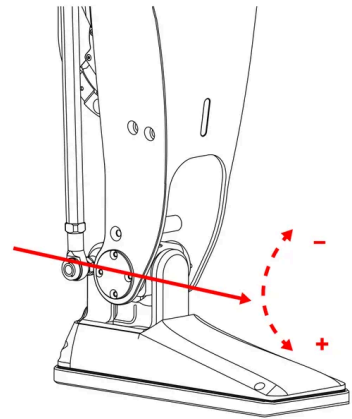
Y-axis



ANKLE_PITCH_R

Range: -42° to 41°

X-axis



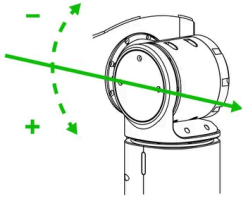
ANKLE_ROLL_R

Range: -20° to +20°

5. LEFT ARM 7 DOFS

JOINT	AXIS	MIN (°)	MAX (°)
SHOULDER_PITCH_L	Y	-180	60
SHOULDER_ROLL_L	X	-10	180
SHOULDER_YAW_L	Z	-90	90
ELBOW_PITCH_L	Y	-120	0
WRIST_YAW_L	Z	-90	90
WRIST_ROLL_L	X	-70	50
WRIST_PITCH_L	Y	-40	40

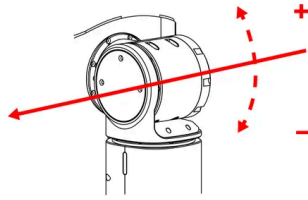
Y-axis



SHOULDER_PITCH_L

Range: -180° to +60°

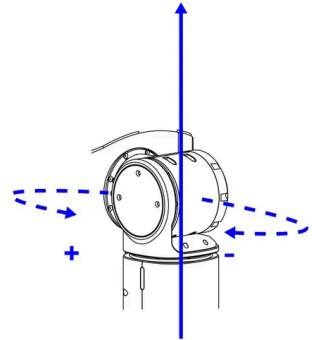
X-axis



SHOULDER_ROLL_L

Range: -10° to 180°

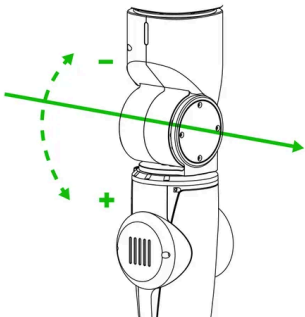
Z-axis



SHOULDER_YAW_L

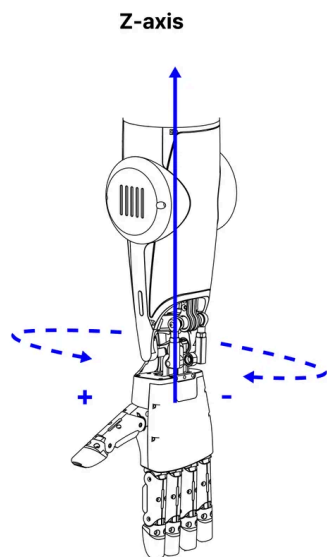
Range: ±90°

Y-axis



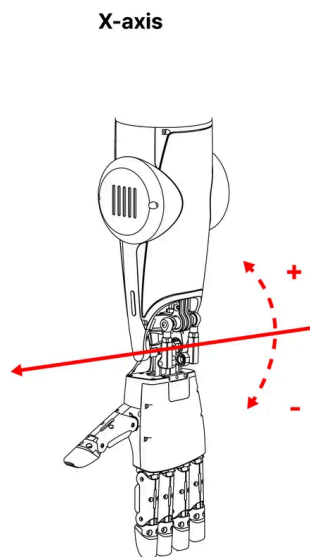
ELBOW_PITCH_L

Range: -120° to 0°



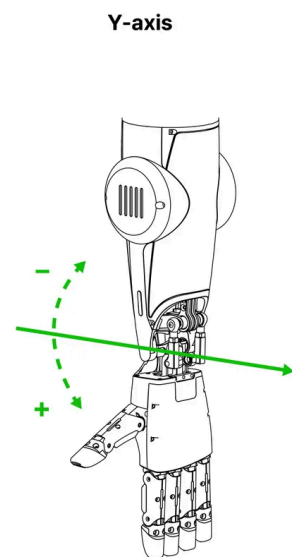
WRIST_YAW_L

Range: $\pm 90^\circ$



WRIST_ROLL_L

Range: -70° to 50°



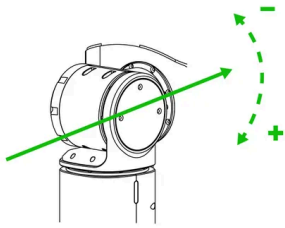
WRIST_PITCH_L

Range: -40° to $+40^\circ$

6. RIGHT ARM 7 DOFS

JOINT	AXIS	MIN ($^\circ$)	MAX ($^\circ$)
SHOULDER_PITCH_R	Y	-180	60
SHOULDER_ROLL_R	X	-180	10
SHOULDER_YAW_R	Z	-90	90
ELBOW_PITCH_R	Y	-120	0
WRIST_YAW_R	Z	-90	90
WRIST_ROLL_R	X	-50	70
WRIST_PITCH_R	Y	-40	40

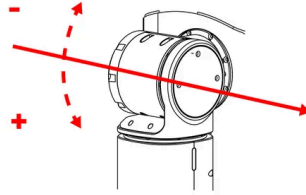
Y-axis



SHOULDER_PITCH_R

Range: -180° to +60°

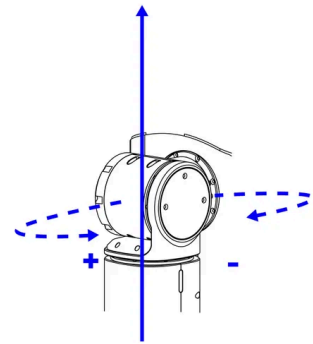
X-axis



SHOULDER_ROLL_R

Range: -180° to 10°

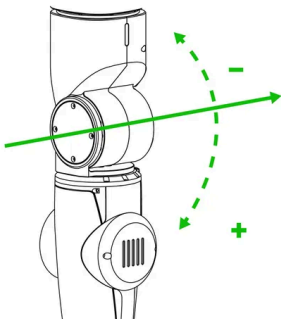
Z-axis



SHOULDER_YAW_R

Range: ±90°

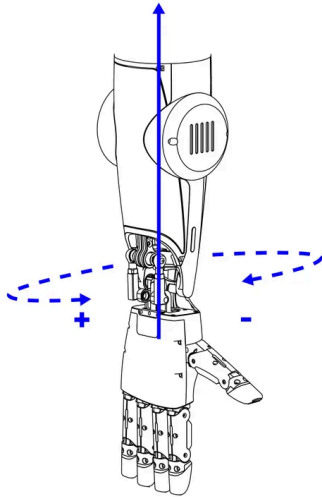
Y-axis



ELBOW_PITCH_R

Range: -120° to 0°

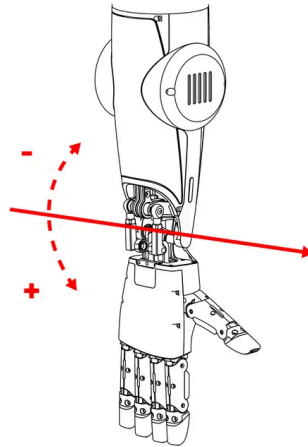
Z-axis



WRIST_YAW_R

Range: $\pm 90^\circ$

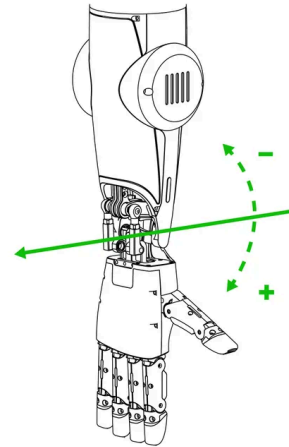
X-axis



WRIST_ROLL_R

Range: -50° to 70°

Y-axis



WRIST_PITCH_R

Range: -40° to $+40^\circ$

Specs (Camera)

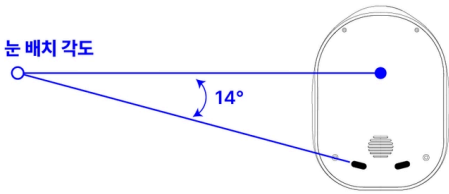
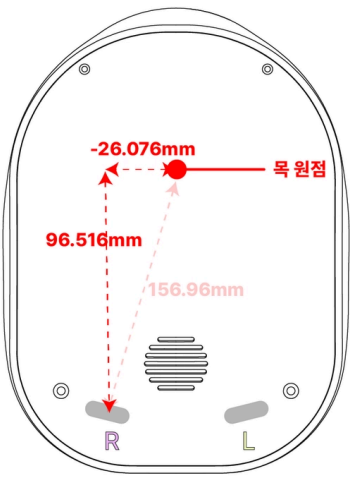
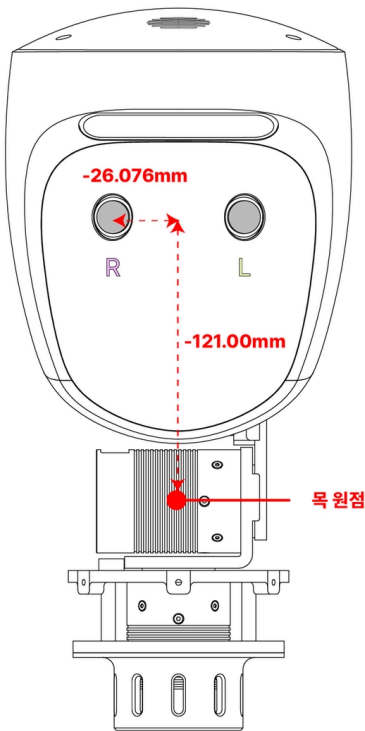
RGB Cameras

R

위치	각도
x = 95.516	x = 0°
Y = -26.076	Y = 0°
Z = 121.00	Z = -14°

L

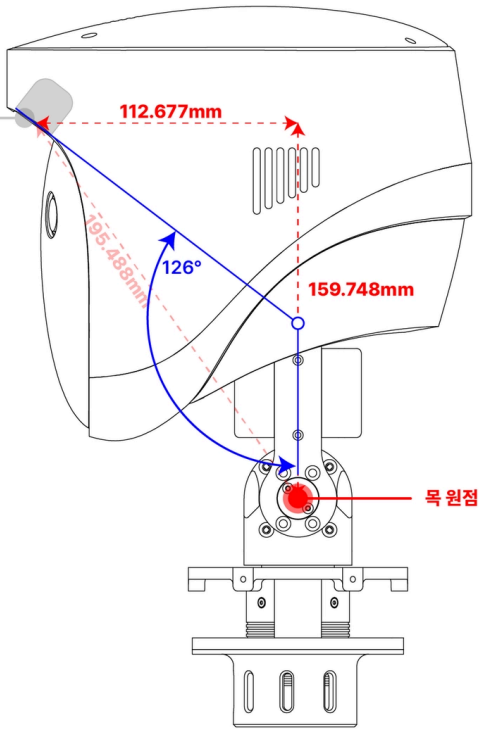
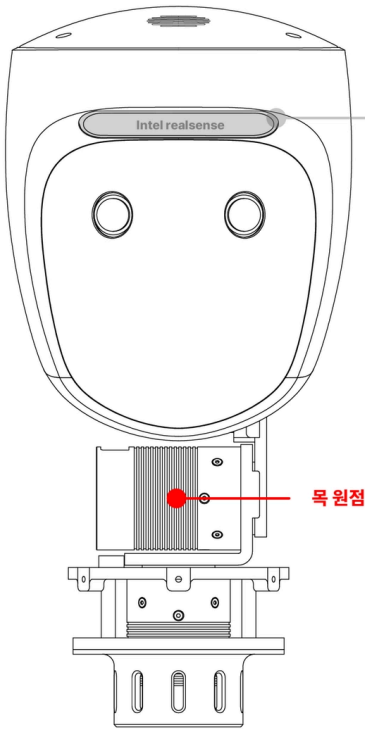
위치	각도
x = 95.516	x = 0°
Y = +26.076	Y = 0°
Z = 121.00	Z = +14°



Intel realsense

위치
x = 112.677
Y = 0
Z = 159.748

각도
x = 0°
Y = 54°
Z = 0°



Safety Guidelines

1. General Guidelines

- This product must be operated in accordance with the provided user manual. Failure to follow the instructions may result in product damage or unexpected behavior.
- Before operating the robot, ensure that you fully understand the operating procedures and basic functions.
- Before use, always check the power status, battery level, and surrounding environment.
- Ensure that no people, pets, or hazardous objects are within the robot's operating range.
- Do not operate the robot while under the influence of alcohol, medication, or any condition that may impair attention or judgment.
- Familiarize yourself with the Emergency Motor Off (EMO) procedures, including the E-Stop button and E-Stop remote controller, before operation.

2. Emergency Motor Off (EMO)

- The EMO function is a safety mechanism designed to immediately stop robot operation in emergency situations.
- The EMO function can be activated using either: The E-Stop button located on the rear of the robot, The E-Stop remote controller included in the package

1. E-Stop Button

- Pressing the red E-Stop button on the rear of the robot activates the EMO function.
- When the button is pressed down, the EMO function is active. The button in the released position indicates normal operating status.

2. E-Stop Remote Controller

- Each press of the E-Stop remote controller alternately sends EMO ON/OFF signals.

3. EMO Safety Precautions

- Activating EMO immediately forces Torque OFF and Motor OFF.
- Before activating EMO, ensure that the surrounding environment is safe.
- Whenever possible, secure the robot with a hoist before activating EMO.

- For safety reasons, neck joint torque and the head indicator remain active when EMO is triggered.

3. Operating Environment Requirements

- This product is designed for indoor use only and must be operated under the following conditions:

Item	Requirement
Temperature	10°C – 40°C
Humidity	30% – 80% (non-condensing)
Floor Surface	Flat and solid indoor flooring (e.g., concrete, tile)
Exposure Conditions	Do not use in environments exposed to water, snow, rain, dust, sand, or gravel
Electromagnetic Interference	Avoid operation near high-power electronic equipment, industrial machinery, or high-density Wi-Fi environments due to potential communication delays or loss of control

- Operation outside these conditions may result in malfunction, falls, or damage to internal components.
- When not in use, store the robot in a dry, well-ventilated location away from direct sunlight.

4. Safe Distance Requirements

- Always operate the robot within your field of view.
- Maintain a minimum safety distance of 1.0 meter between the operator and the robot.
- To prevent injury, never place your hands near the robot's joints, including the arms, legs, or waist.
- Do not approach the robot unnecessarily while it is operating, as this may result in personal injury or equipment damage.
- When multiple people are working around the robot, designate a safety supervisor and clearly restrict access using safety lines, fences, or barriers.
- During demonstrations or exhibitions, assign safety personnel and install warning signs or safety barriers to prevent unintended visitor access.

5. Precautions While Powered On

- When the robot is powered on and standing by, secure it using a stand, hoist, or other appropriate support before operation.

- Do not manually move the robot or force its joints while power is on.
- In emergency situations, immediately activate the EMO function.
- Keep cables and obstacles away from the robot's operating area to prevent tripping or interference.
- Always follow the prescribed power ON/OFF procedures in the manual. Do not remove the battery or forcibly disconnect power while the system is running.

6. Low Battery Warning

- Operating the robot with a low battery may result in posture instability, controller shutdown, or falls.
- If the Head Indicator indicates a low-power condition, stop operation immediately, shut down the robot safely, and recharge the battery.
- Continued operation under low-battery conditions may cause falls and damage to robot components.

7. Operating Limitations

- Exceeding the robot's rated payload capacity or attempting movements beyond mechanical joint limits may result in:
 1. Actuator overload or overheating
 2. Joint position errors and loss of posture control
 3. Abnormal vibration, noise, or forced system shutdown
- Repeated operation near maximum limits may significantly reduce component lifespan.
- If overload or overheating occurs, stop operation immediately and allow the system to cool down or undergo inspection before restarting.
- Operation beyond the limits specified in the product specifications is not covered under warranty and may result in user liability in the event of safety incidents.