

## 1. General Overview

- **Model:** Booster Robotics T1;
- **Type:** Humanoid robot development platform;
- **Height:** 1.18m (standing upright);
- **Weight:** Approximately 30kg;
- **Structure:** Consists of a head, torso, two arms and two legs.

## 2. Kinematics & Degrees of Freedom (DoF)

The robot has a total of **23 active Degrees of Freedom**:

- **Head (2 DoFs):** Yaw Joint, Pitch Joint;
- **Arms (4 DoFs each):** Shoulder Pitch, Shoulder Roll, Shoulder Yaw, Elbow Joint. *(Note: Expandable to 7 DoFs).*
- **Waist (1 DoF):** Waist Yaw Joint;
- **Legs (6 DoFs each):** Hip Pitch, Hip Roll; Hip Yaw, Knee, Ankle Up, Ankle Down.

## 3. Sensors & Perception

- **Vision:** Depth Camera (located in the head).
- **Audio:** Microphone Array and Speaker.
- **Safety:** Emergency Stop button.

## 4. Computing & Electronics

The hardware architecture depends on the version:

- **Basic Version:**
  - **Processor:** 1x NVIDIA Jetson AGX Orin (32GB) handling both motion and perception.
- **Standard Version:**
  - **Motion Control Board:** 1x Express-17 (Intel Core i7 8-core).
  - **Perception Board:** 1x NVIDIA Jetson AGX Orin (32GB).
- **Connectivity:** Wi-Fi 6, Bluetooth 5.2.

## 5. Performance

- **Walking Speed:** 0.5 m/s (Omnidirectional);
- **Turning Speed:** 1.5 rad/s;
- **Battery:** ~1.5 hours battery life; charging time  $\leq$  2 hours;
- **Payload/Stability:** Capable of walking on uneven surfaces and resisting impact disturbances.

