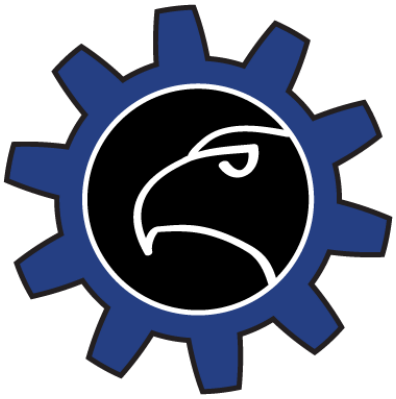


Falcons South Korea 2026 Qualification Materials

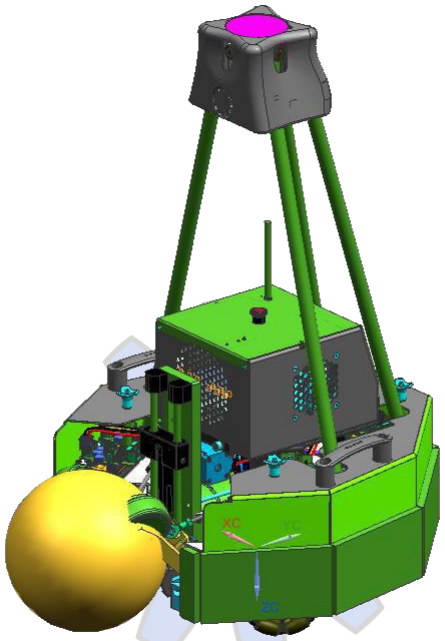
Table of Contents

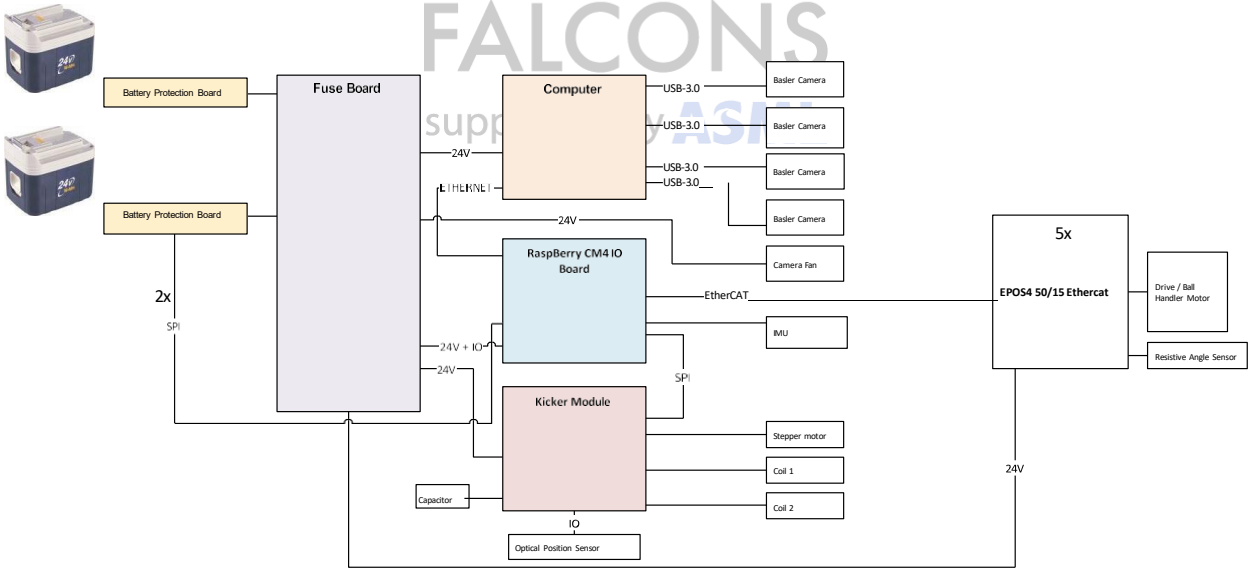
Team Description Paper

1 Field player

1.1 Introduction

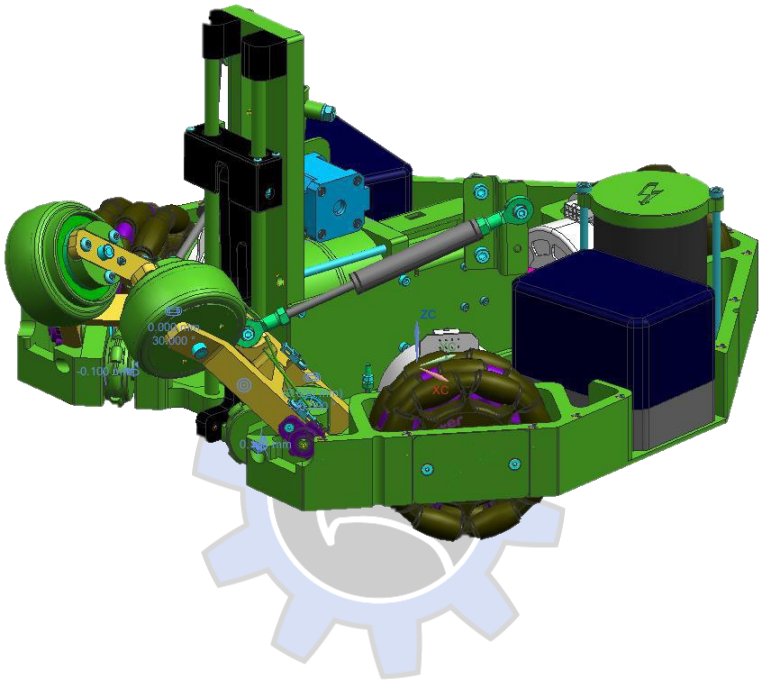
Our middle-size league robot for RoboCup 2026, named V1 Platform, is a technological marvel designed for optimal performance on the playing field. With dimensions of 520x520x790mm and a weight of 38kg, the V1 Platform boasts stability, agility, and a comprehensive set of features.





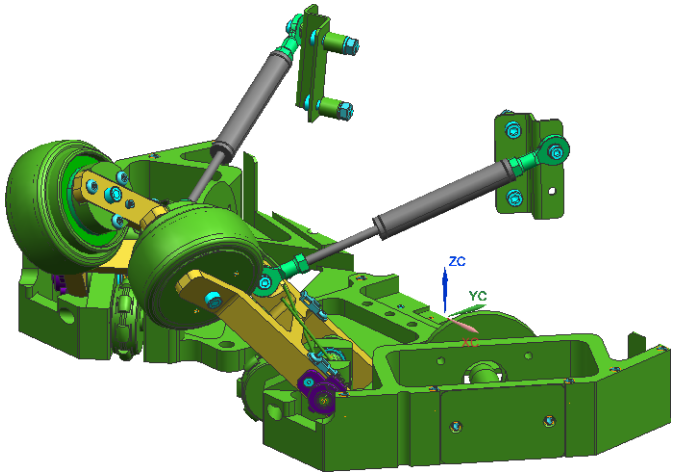
1.2 Bottom Mechanics with Drive Motors & Wheels

The robot's locomotion system utilizes Rotacaster 125mm triple wheels powered by Maxon EC90 400W Direct Drive Motors. The power source consists of a 24V 4.5Ah NiMh Battery with a dedicated Battery Protection Board. Additional components include a Shooting Capacitor (450V, 4.7mF), Kicker Module, and a robust bottom frame milled from 7000 series aluminum.



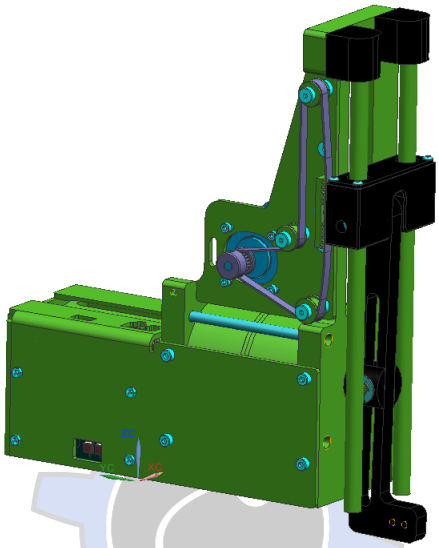
1.3 Ball Handlers

The V1 Platform excels in ball handling with a milled aluminum Ball Handler Arm, propelled by a Maxon EC60 Frameless 100W Direct Drive Motor. Precision and control are enhanced through the integration of a Hydraulic Damper, Return Spring, and a Resistive Angle Sensor.



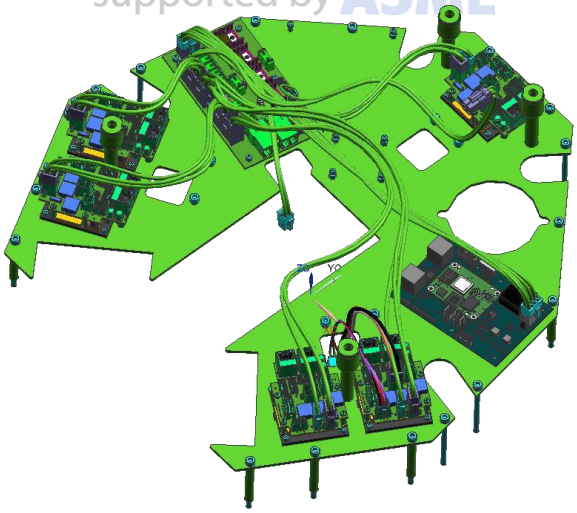
1.4 Kicker Module

The Kicker Module mirrors the Ball Handler's design, featuring a milled aluminum arm powered by a Maxon EC60 Frameless 100W Direct Drive Motor. The incorporation of a Hydraulic Damper, Return Spring, and Resistive Angle Sensor ensures a cohesive and effective kicking mechanism.



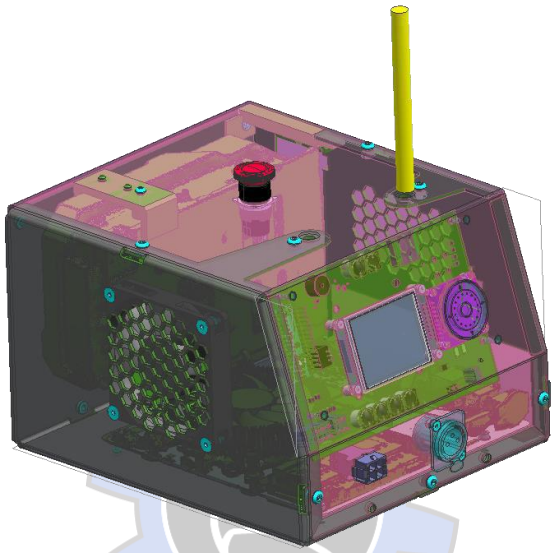
1.5 Middle Mechanics with Electronics

Central to the robot's functionality is the middle section, housing essential electronics on a 2mm aluminum Mounting Plate. This includes a Fuse Board, Raspberry CM4 IO Board, and five Maxon EPOS4 50/15 Ethercat controllers, forming a centralized and efficient control system.



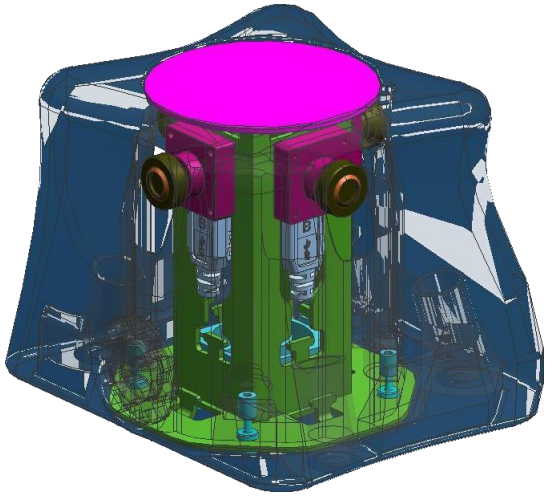
1.6 Computer Box

The custom-designed Computer Box serves as the robot's brain, enclosed in a robust casing. It features a DC-DC converter (0-60V to 12V) with an LCD for monitoring and control. The core comprises an ITX Motherboard with an Intel I5 13600 processor, coupled with a GeForce RTX3060 for advanced computational capabilities. Dual WIFI antennas ensure robust communication, and an Emergency Off Button provides a secure shutdown option.



1.7 Top Module with Cameras

The top module is equipped with 3D-printed holders, carbon fiber tubes, and a 3D-printed hood to house and protect components. It accommodates a Basler Dart 54um Camera with USB-C connectivity, ensuring high-resolution vision for effective gameplay analysis. A 40mm fan with an inner frame contributes to temperature control, enhancing the reliability of the top module.



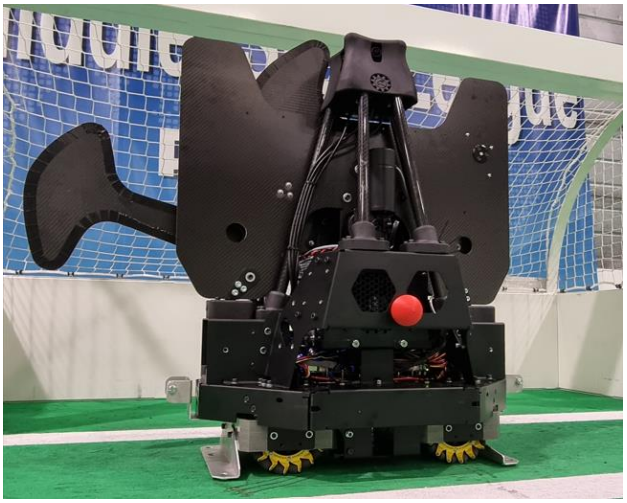
1.8 Conclusion

In conclusion, the V1 Platform is a meticulously designed robot that seamlessly integrates mechanical and electronic components. With its robust construction and advanced features, it stands as a formidable contender in the RoboCup 2026 middle-size league, poised to deliver outstanding performance on the playing field.

2 Keeper

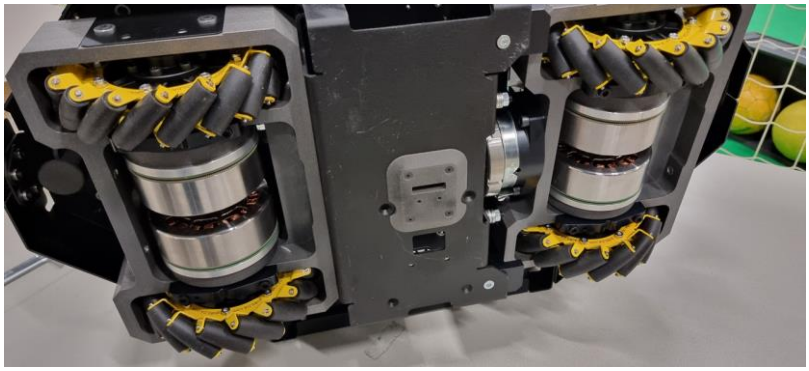
2.1 Introduction

The Falcons keeper is a new designed robot featuring a 4-wheel drive mechanism and a top module with moving arms that can be positioned by software to intercept the ball.

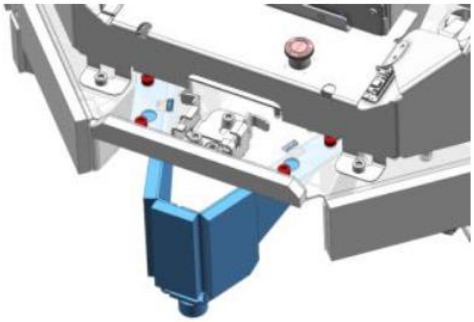


2.2 Bottom Mechanics wheels, drive motors, electronics)

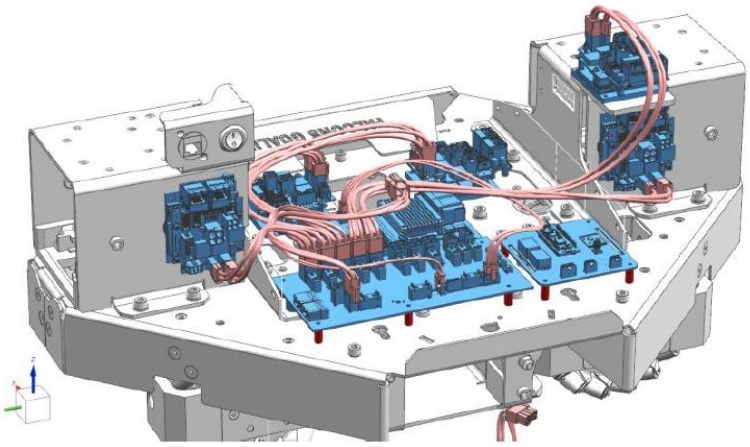
The keeper has four large omni-wheels oriented in the main driving direction. The motors are of the same type as the field players. To ensure full grip of all wheels on uneven surfaces the two right motors are mounted on a moveable frame.



At the back of the keeper is a small support with a roller ball to prevent tilting due to ball impact.

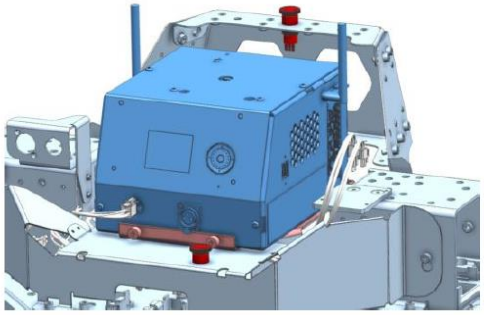


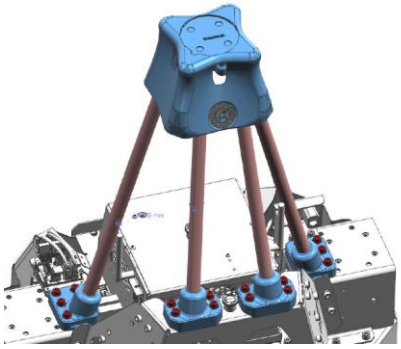
All electronics and batteries are mounted on the lower frame as shown below.



2.3 Computer box and cameras

The computer box is the same as the box of the field players with two small modifications: 1) position if WIFI antenna's and 2) the EMO button is replaced by two EMO buttons on the frame

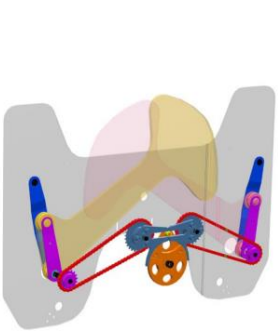


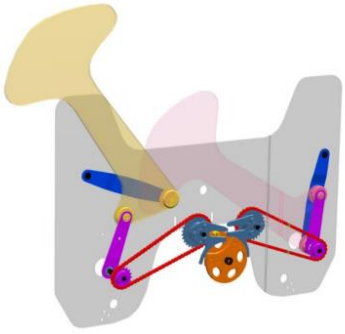


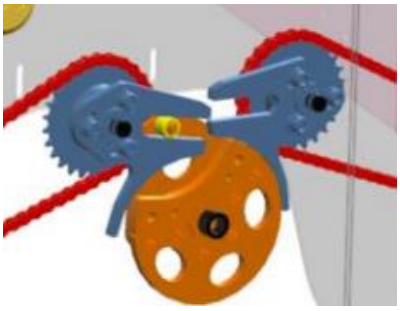
For the camera module shorter tubes are used.

2.4 Keeper arms module

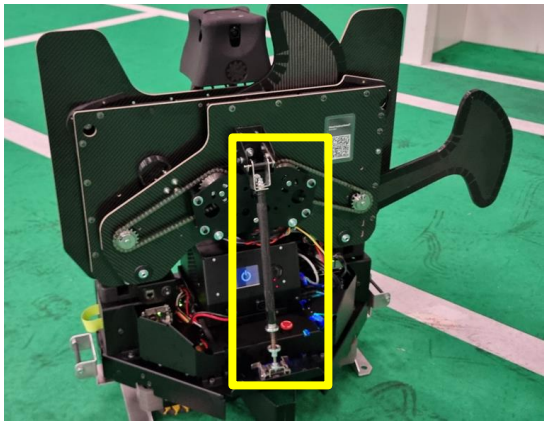
The top module of the keeper has two arms that can be extended and positioned according the estimated ball trajectory. The arms are driven by a wind shield wiper motor mounted below the camera housing. The mechanism ensures only one arm can be extended at the time. Pictures below show the mechanism details. The red chains have been replaced by timing belts.







On the rear of the arm mechanism is a damped spring support enabling 3 degrees tilt backwards of the arm mechanism and absorbing some energy from the ball impact.



2.5 Conclusion

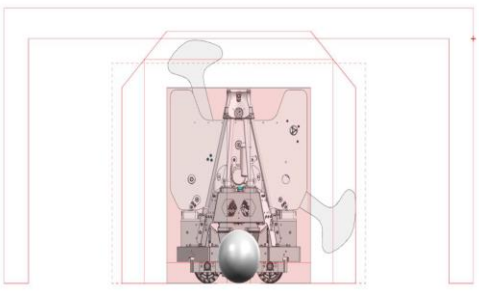
The new keeper design features:
- 4-wheel drive system optimized for driving speed left/right in front of the goal.
- new innovative moving arm concept, enabled by new Robocup rules. Using state of the art carbon fiber/foam composite material for weight reduction.
- modular design, enabling easy access to critical parts for repairs.
- 5th wheel support to prevent tilting backward at ball impact.

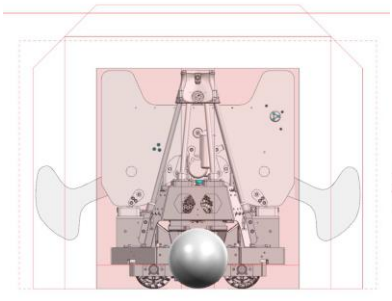
A detailed description of the keeper mechanics is available at:

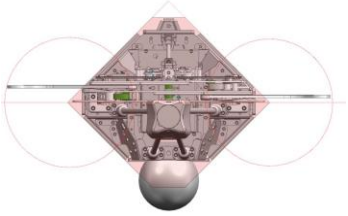
2.6 Keeper dimensions and weight

The keeper dimensions are 516 x 516 x 793 mm (red square in pictures below is 520x520x800 mm robocup volume). The arm extension dimension complies with RC-4.2.0 Robot Size and RC-4.2.1: Robot Shape. (Extended one point/triangle surface instead of rectangular extension surface.)
The ball and goal post are shown for reference

The keeper weight is 38 kg.







3 List of Results and Awards in Last Three Years

1. RoboCup World Championship 2025- Brazil

Tournament: DNP

Scientific Challenge: DNP

Technical Challenge: DNP

2. RoboCup World Championship 2024- Eindhoven, Netherlands

Tournament: 3nd

Scientific Challenge: 5th

Technical Challenge: 2nd

3. RoboCup World Championship 2023- Bordeaux, France

Tournament: 2nd

Scientific Challenge: 2nd

Technical Challenge: 1st

4. RoboCup World Championship 2022- Bangkok, Thailand

Tournament: 2nd

Scientific Challenge: 6th

Technical Challenge: 3rd

4 List of Team Contributions to the MSL Community

- Member of organization committee MSL Robocup Brazil, M.N.Fonseca (2024)
- Co-Host MSL Workshop together with VDL Robotsports (2023)
- Member of MSL Technical committee, E. Schreuder (2018 - 2021)
- Member of organization committee MSL Robocup Montreal, E. Schreuder (2018)
- Sharing field with Tech United & VDL Robotsports & RIF (Fontys Eindhoven) for development and local tournaments (2015-present)
- Referee semifinals/finals during World Championship Leipzig (2016)
- Co-Host MSL Workshop together with Tech United and VDL Robotsports (2014 / 2017)
- Co-chair Robocup European Open 2016, R.J.E. Merry (2016)
- Contributed to the Refbox interface and MSL rules (2016)
- Chair Robocup 2013, R.J.E. Merry (2013)

5 Miscellaneous

- Declaration of mixed teams: Yes
- Team requires 802.11b access point: No

6 List of MAC Addresses Used by the Team

Robots (needs update with new robots):

Hostname	MAC (wireless)	MAC (ethernet)
r1	00:16:6f:f7:f6:20	d0:50:99:af:71:1c
r2	00:16:6f:f7:f1:7a	70:85:c2:10:23:d4
r3	00:16:6f:f7:f1:d4	70:85:c2:10:23:63
r4	00:16:6f:f7:f0:e4	70:85:c2:10:22:ae
r5	00:16:6f:f7:f8:23	70:85:c2:10:24:8e
r6	00:16:6f:f7:f1:1b	d0:50:99:af:70:da

7 Development laptops:

The internal member selection procedure has not been finished yet. Therefor this list cannot be provided now. The list will be completed in due time.

Developer	Hostname	MAC (wireless)	MAC (ethernet)
	Coach	60:67:20:00:5c:54	b4:b5:2f:31:6a:5e

8 Robot Dimensions

- Length: 45cm
- Width: 45cm
- Weight: 37.8 kg