YouBot Detailed Specifications

From youBot wiki

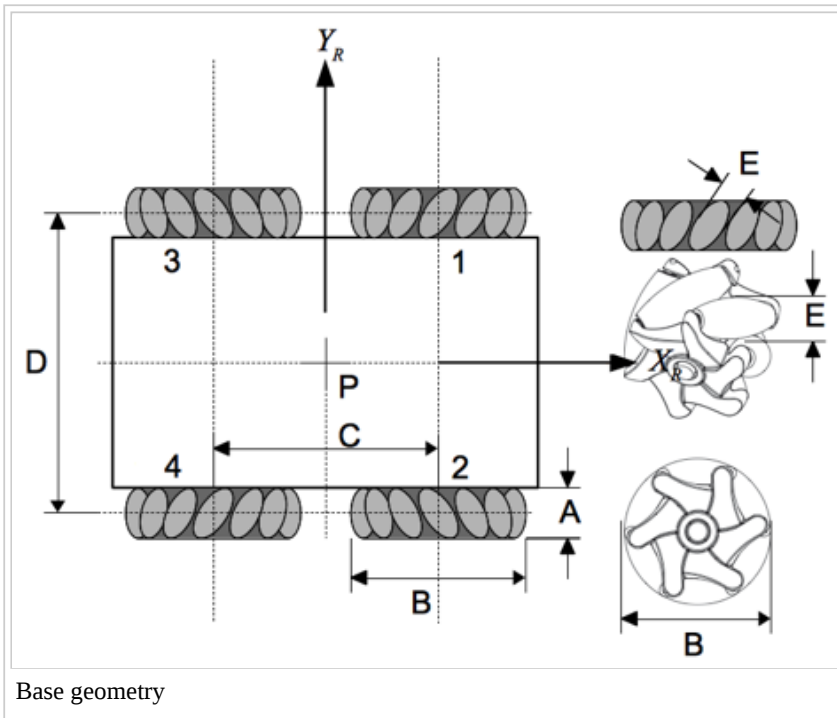## Contents

Base

General Info

- Overall Weight : ~20 kg
- Permissible Payload : 20 kg
- Overall Length : 580 mm
- Overall Widht : 380 mm
- Overall Height : 140 mm
- Minimum velocity : 0.01 m/s
- Maximum velocity: 0.8 m/s
- Power supply: 24 V
- Communication: EtherCad

Detailed base geometry

Base geometry

A = 74,87 mm B = 100 mm C = 471 mm D = 300,46 mm E = 28 mm (max diameter of the roll)

- Ground Clearance : 20 mm

You can also have a look at the base configuration files of the youBot driver here (https://github.com/youbot/youbot_driver/blob/master/config/youbot-base.cfg).

Base Actuator

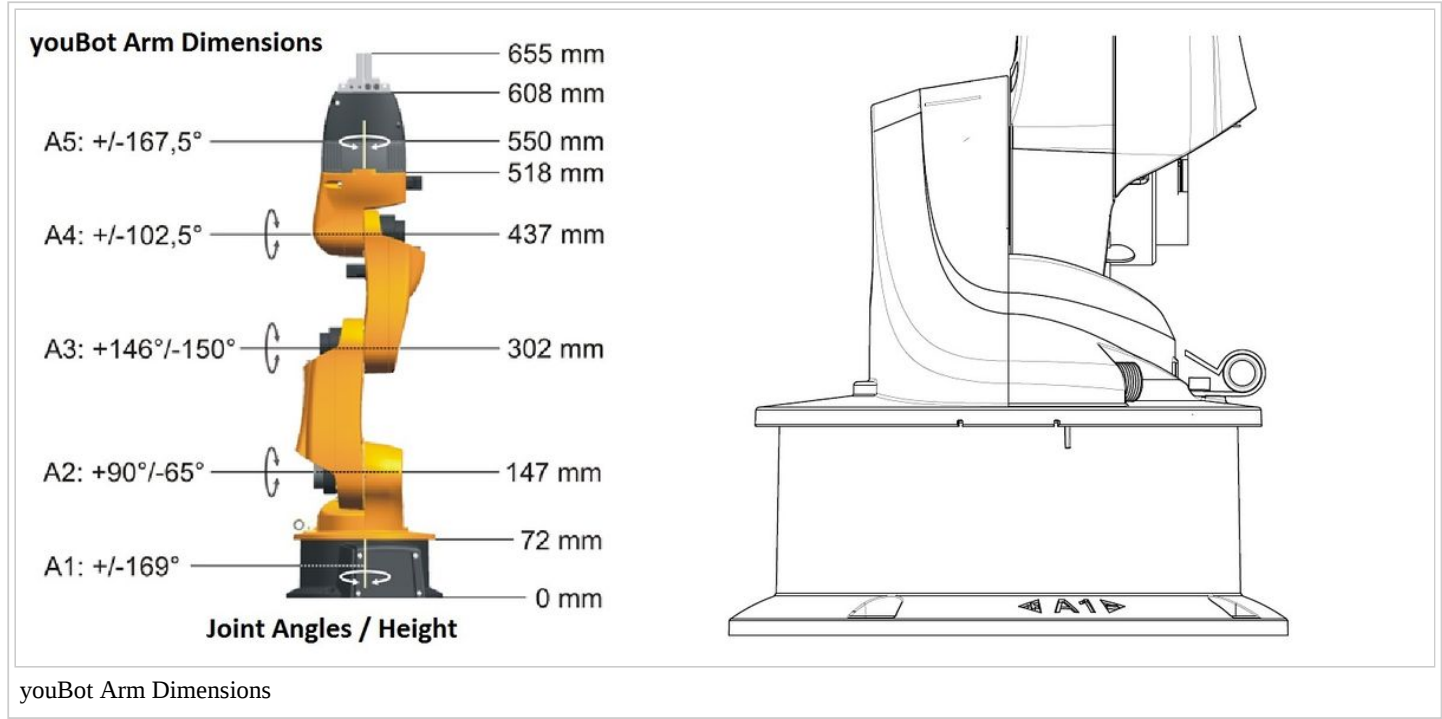For detailed info, refer to the #Actuator_Data

Wheels

- Type : Omni-directional
- Number of wheels : 4
- Diameter : 47,5 mm

Arm

General Info

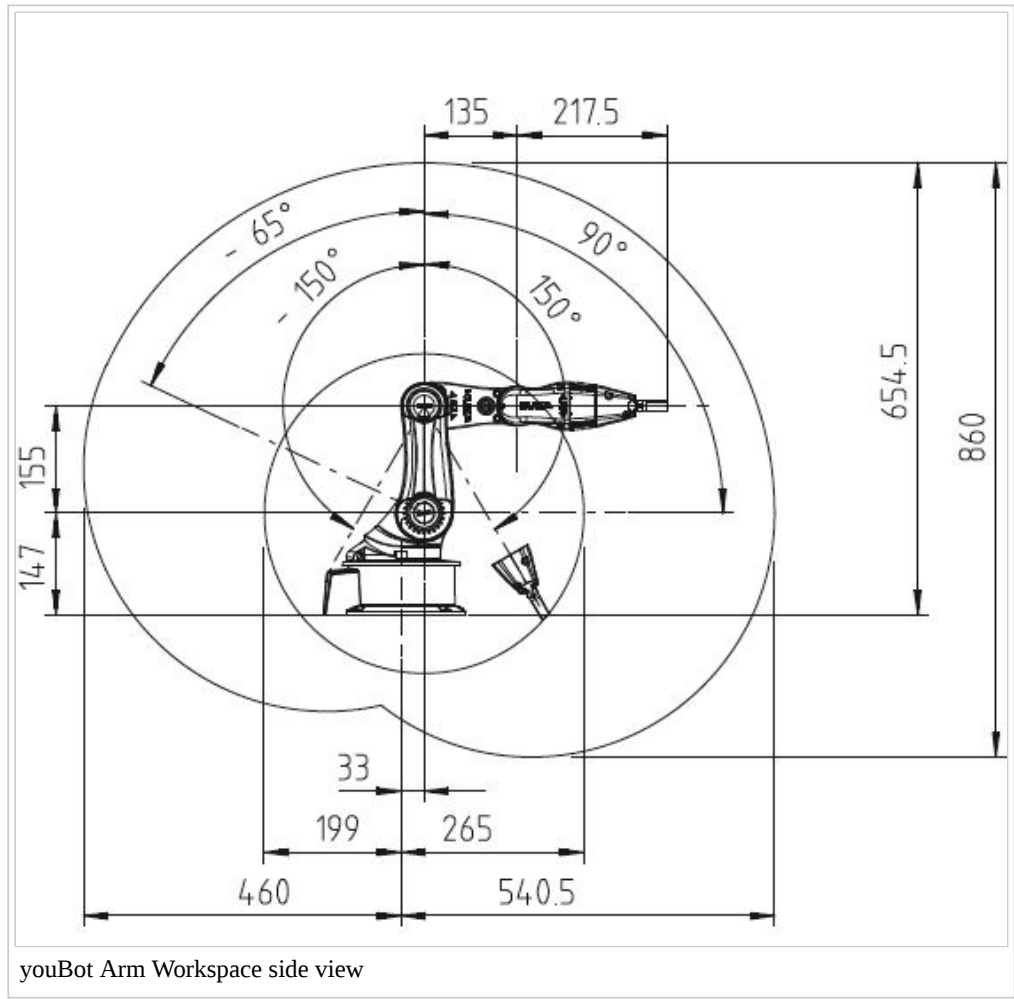- No. of Axis : 5
- Height : 655 mm
- Work envelope : 0.513 m2
- Weight : 5.3 kg
- Payload : 0.5 kg
- Structure : Magnesium Cast
- Position repeatability : 1 mm
- Communication : EtherCAT
- Voltage connection : 24V DC
- Drive train power limitable to : 80 W
- Axis Speed : 90 deg/s
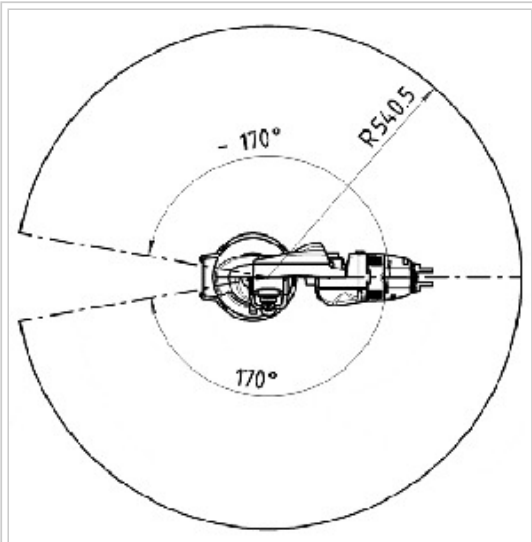- Encoders threshold: 1.000 Hz

Arm kinematics

youBot Arm Dimensions

Workspace

youBot Arm Workspace side view

youBot Arm Workspace top view

Arm Actuator

Axis data Range Velocity

```
axis 1   +/− 169°        90 °/s
axis 2   + 90°/− 65°     90 °/s
axis 3   + 146°/ - 151°  90 °/s
axis 4   +/− 102,5°      90 °/s
axis 5   +/− 167,5°      90 °/s
```

For detailed info, refer to the #Actuator_Data

You can also have a look at the arm configuration files of the youbot driver here
(https://github.com/youbot/youbot_driver/blob/master/config/youbot-manipulator.cfg).

Actuator Data

Actuator Data	Joint 1	Joint 2	Joint 3	Joint 4	Joint 5	Wheel
Motor						
Nominal Voltage (V)	24	24	24	24	24	24
Nominal Current (A)	2.32	2.32	2.32	1.07	0.49	2.32
Nominal Torque (mNm)	82.7	82.7	82.7	58.8		82.7
Terminal Inductance (mH)	0.573	0.573	0.573	2.24	7.73	0.573
Terminal Resistance (Ω)	0.978	0.978	0.978	4.48	13.7	0.978
Moment of Inertia (kg*mm2)	13.5	13.5	13.5	9.25	3.5	13.5
Rated speed (RPM)	5250	5250	5250	2850	2800	5250
Weight (g)	110	110	110	75	46	110
Gearbox						
Reduction Ratio	156	156	100	71	71	26
Moment of Inertia (kg*mm2)	0.409	0.409	0.071	0.07	0.07	0.14
Weight (g)						224
Encoder						
Counts per Revolution	4000	4000	4000	4000	4000	4000

Gripper

- Type : Detachable, 2 fingers
- Gripper stroke : 20 mm

- Gripper range : 70 mm

The TMCM-KR-842 is the gripper board for the KUKA youBot arm placed inside the gripper at the upper end of the arm. The main purpose of this board is controlling the two linear stepper motors (connected separately to the board) inside the gripper. These motors move the two gripper fingers. This attached PDF document - which is also shipped with every KUKA youBot - describes the TMCL protocol that is used for the communication by the RS232 interface at the arm.

http://www.youbot-store.com/media/pdf/tmcm-kr-842_firmware_manual_v100_gripperboard.pdf

Battery

Caution: The battery is in general quite sensitive and should never be left connected when the youBot doesn't work because it slowly discharges. It may eventually results in battery failure.

- Type : Maintenance-free lead acid
- Rechargeable : Yes
- Voltage : 24 V
- Capacity : 5 Ah
- Approximate Runtime of youBot : 90 min

Internal PC

- Type : Mini-ITX
- CPU : Intel Atom D510 Dual Core 1.66 GHz
- RAM : 2 GB; SO-DDR2-667 200PIN
- Hard Drive : 32 GB SSD
- Ports : 6 x USB 2.0, 1 x VGA, 2 x LAN (1 available)
- DC Input : 12 V

Motor controller

All used motor controller boards came from TMCM series by Trinamic.

3D model

Collada youBot model can be found here

Attention : All the above data are subject to change and are provided without warranty

Corrections, suggestions, and new documentation should be posted to the Forum (http://www.youbot-store.com/forum/).

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