

Appendix

Robot and vehicle specifications

Table 1. Robot specifications

Overall length	400 mm
Overall height	250 mm
Body width	430 mm
Radius of front wheels (r_{Bf})	12.5 mm
Radius of rear wheels (R_B)	90 mm
Wheelbase (l_B)	225 mm
Distance of the shoulder axis from the rear axes (l_{LB})	150 mm
Height of the shoulder axis above the rear axes (h_{LB})	190 mm
Camera position (l_{CB})	300 mm
Camera height (h_{CB})	-28 mm
Length of upper link (between the shoulder joint and elbow joint) (l_{uL})	330 mm
Length of forearm link (between the elbow joint and hand) (l_{fL})	300 mm
Hand length (l_h)	105 mm
Length from Joint 4 to the connecting position (l_{4C})	370 mm
Mass (M_B)	17.0 kg

Table 2. Overturned vehicle specifications

Overall Length	450 mm
Overall Height	355 mm
Body width	250 mm
Radius of front wheel (r_A)	35 mm
Radius of rear wheel (R_A)	80 mm
Wheelbase (l_A)	190 mm
Target position for connection from the rear axle (l_F)	320 mm
Target Height for connection from the rear axle (h_F)	20 mm
Mass (M_A)	6.5 kg