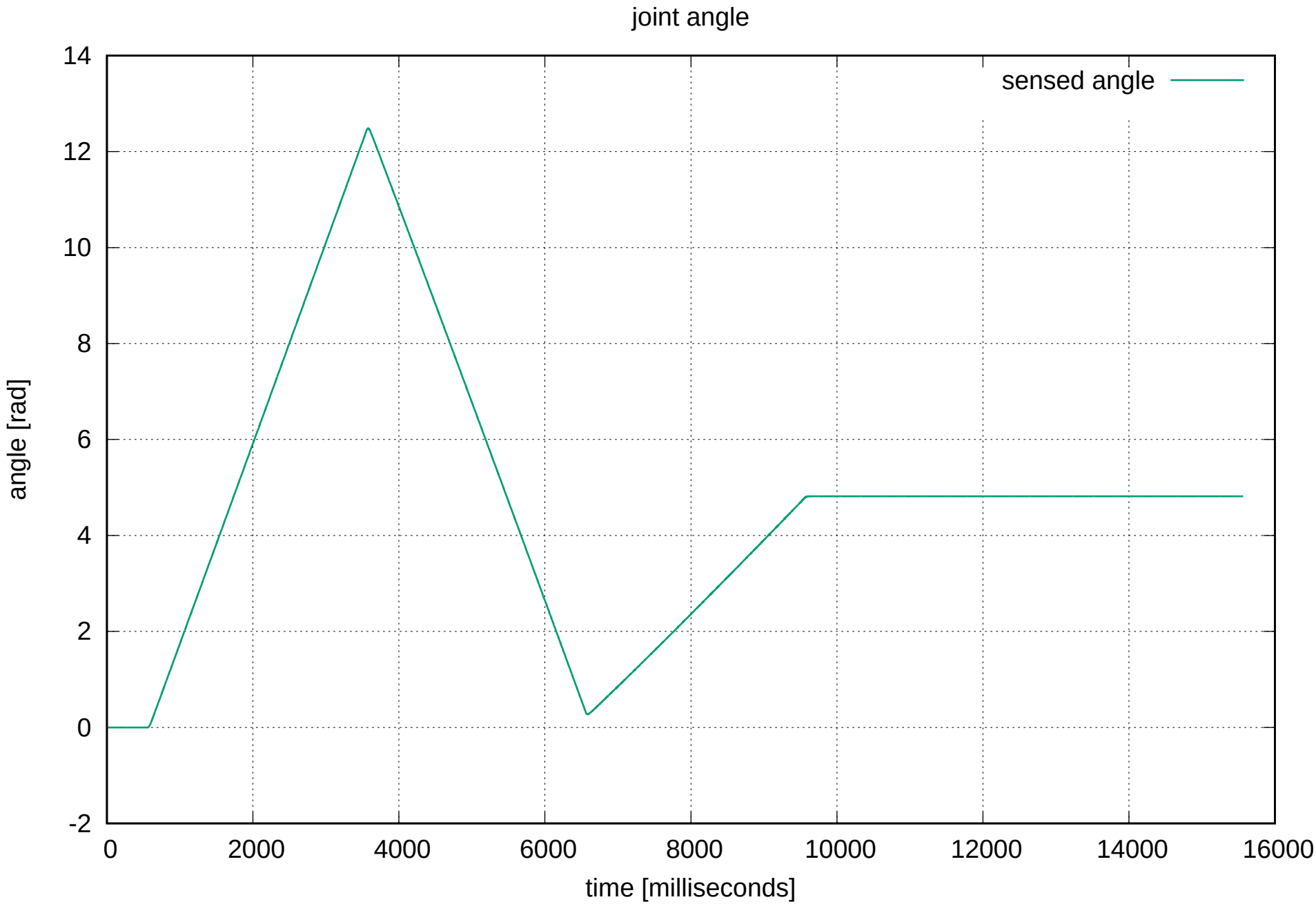
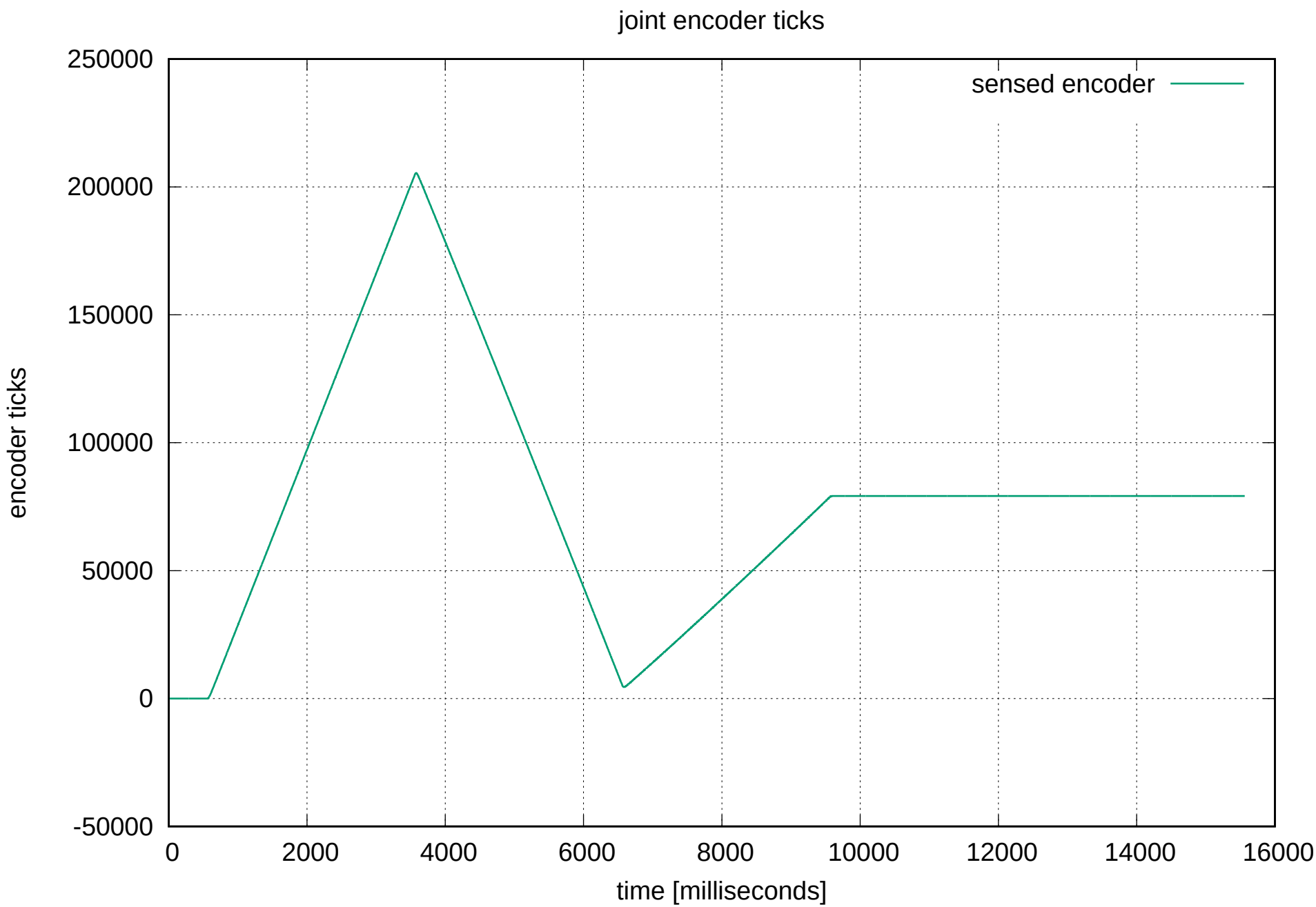
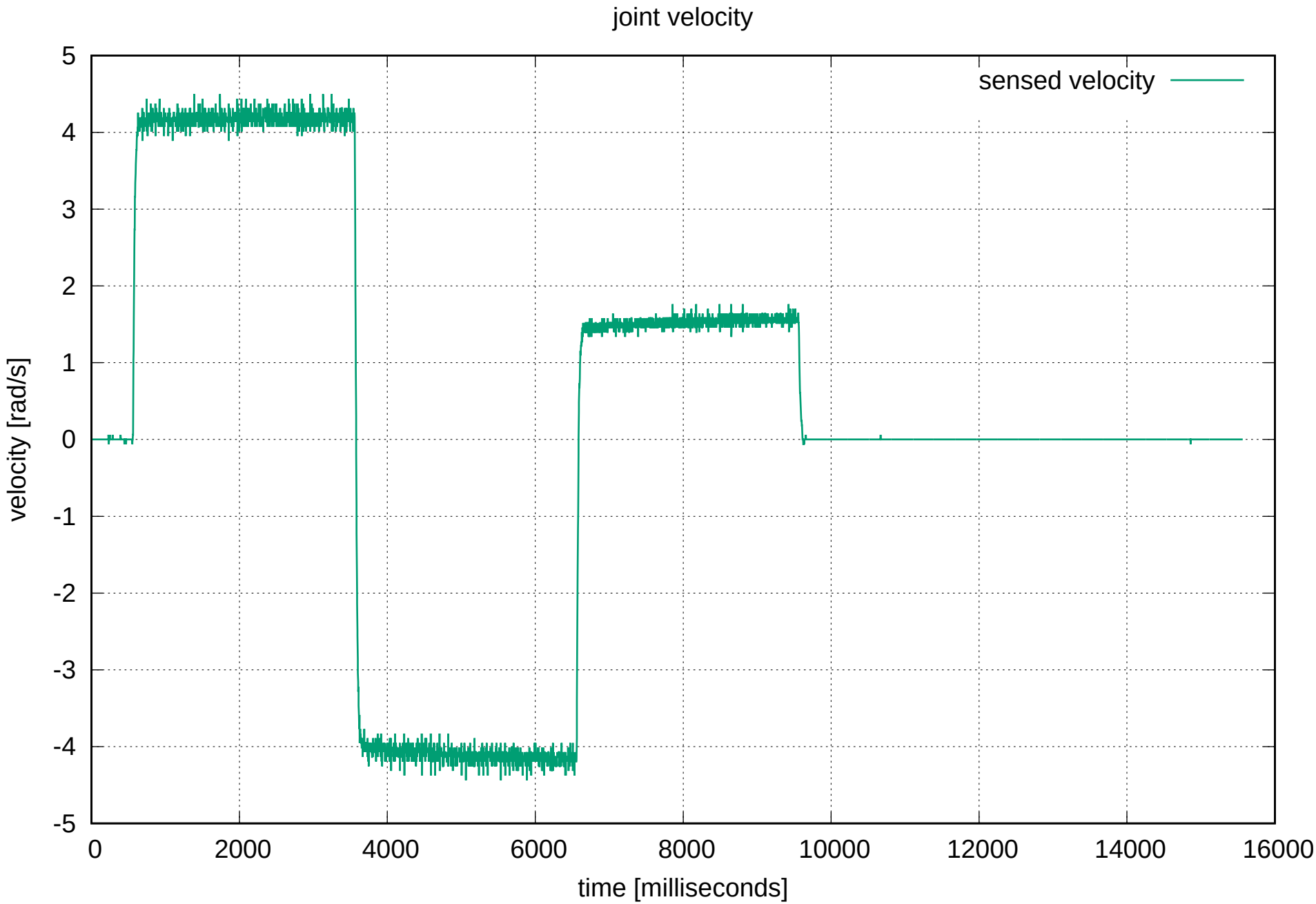
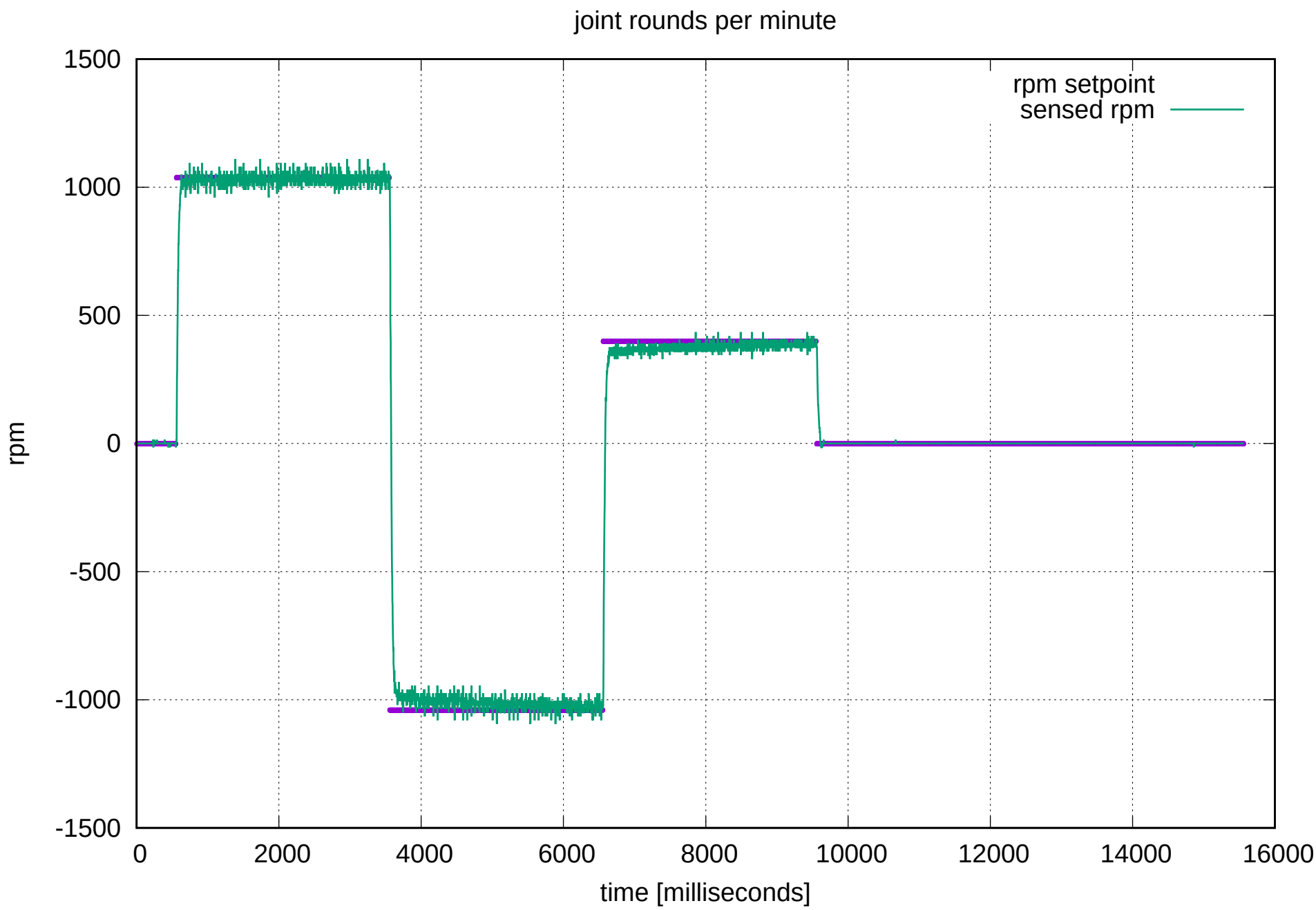
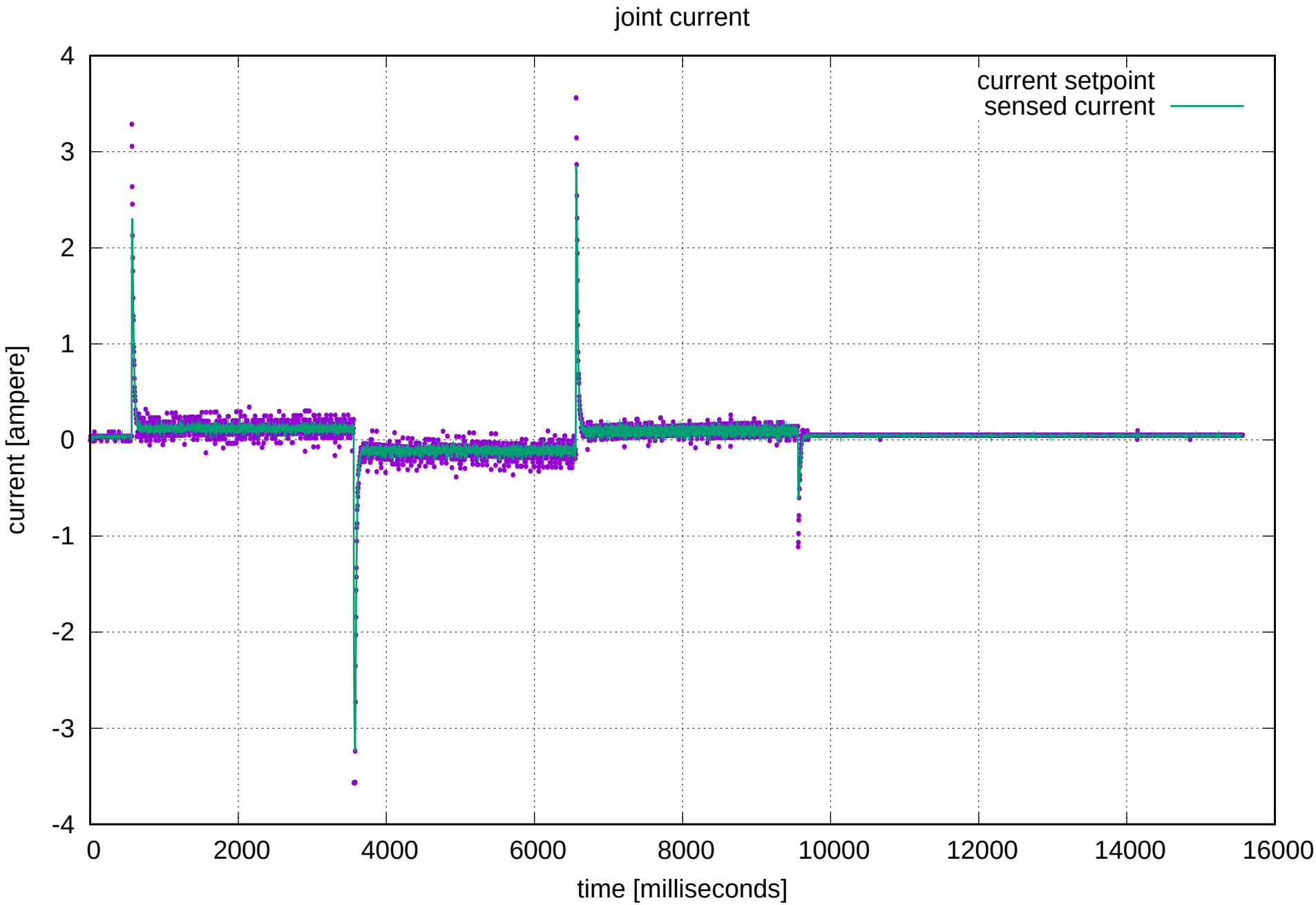
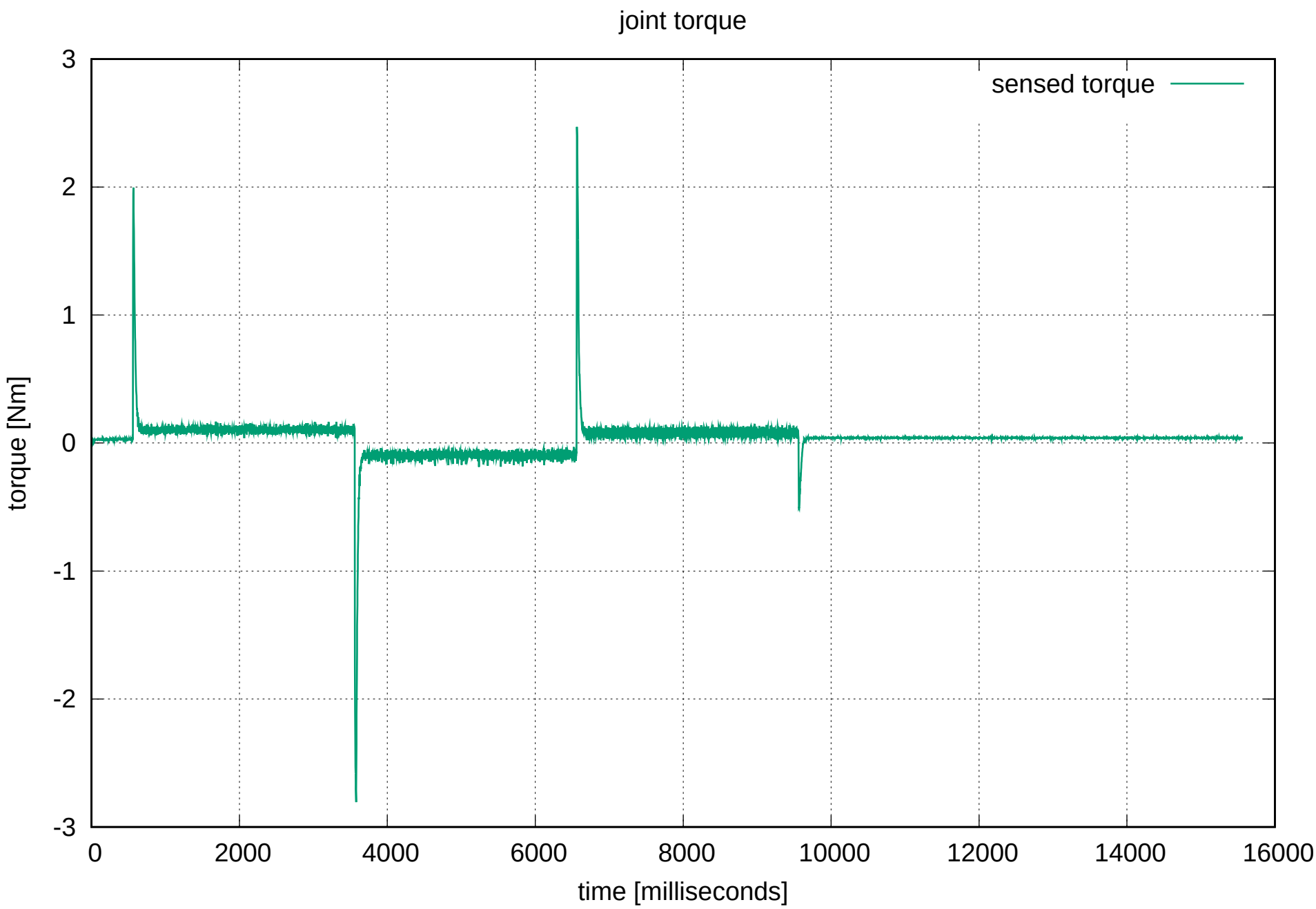

joint angle
sensed angle
angle [rad]
time [milliseconds]
14
12
10
8
6
4
2
0
-2
0
2000
4000
6000
8000
10000
12000
14000
16000

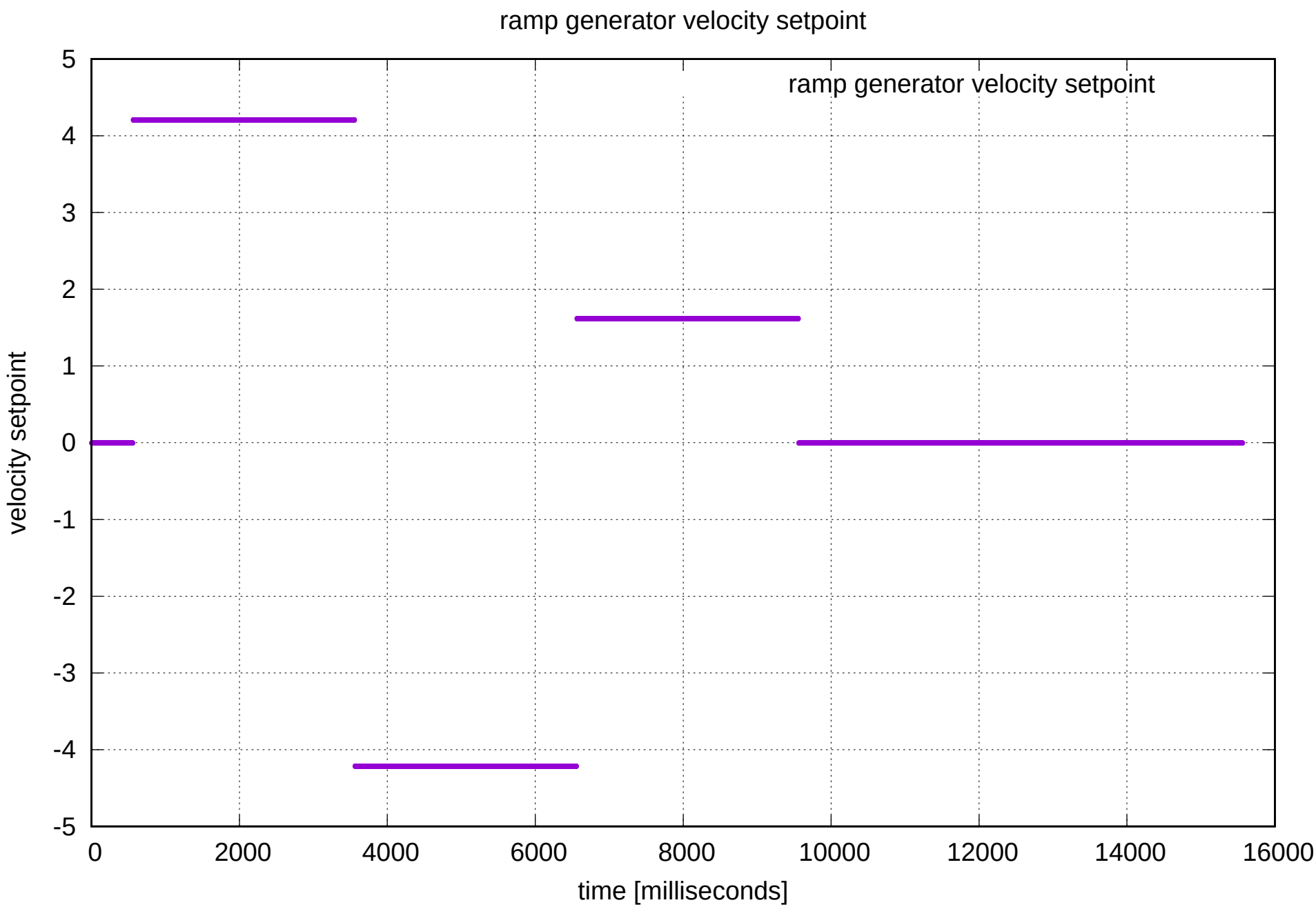

joint encoder ticks
sensed encoder
encoder ticks
time [milliseconds]
250000
200000
150000
100000
50000
0
-50000
0
2000
4000
6000
8000
10000
12000
14000
16000

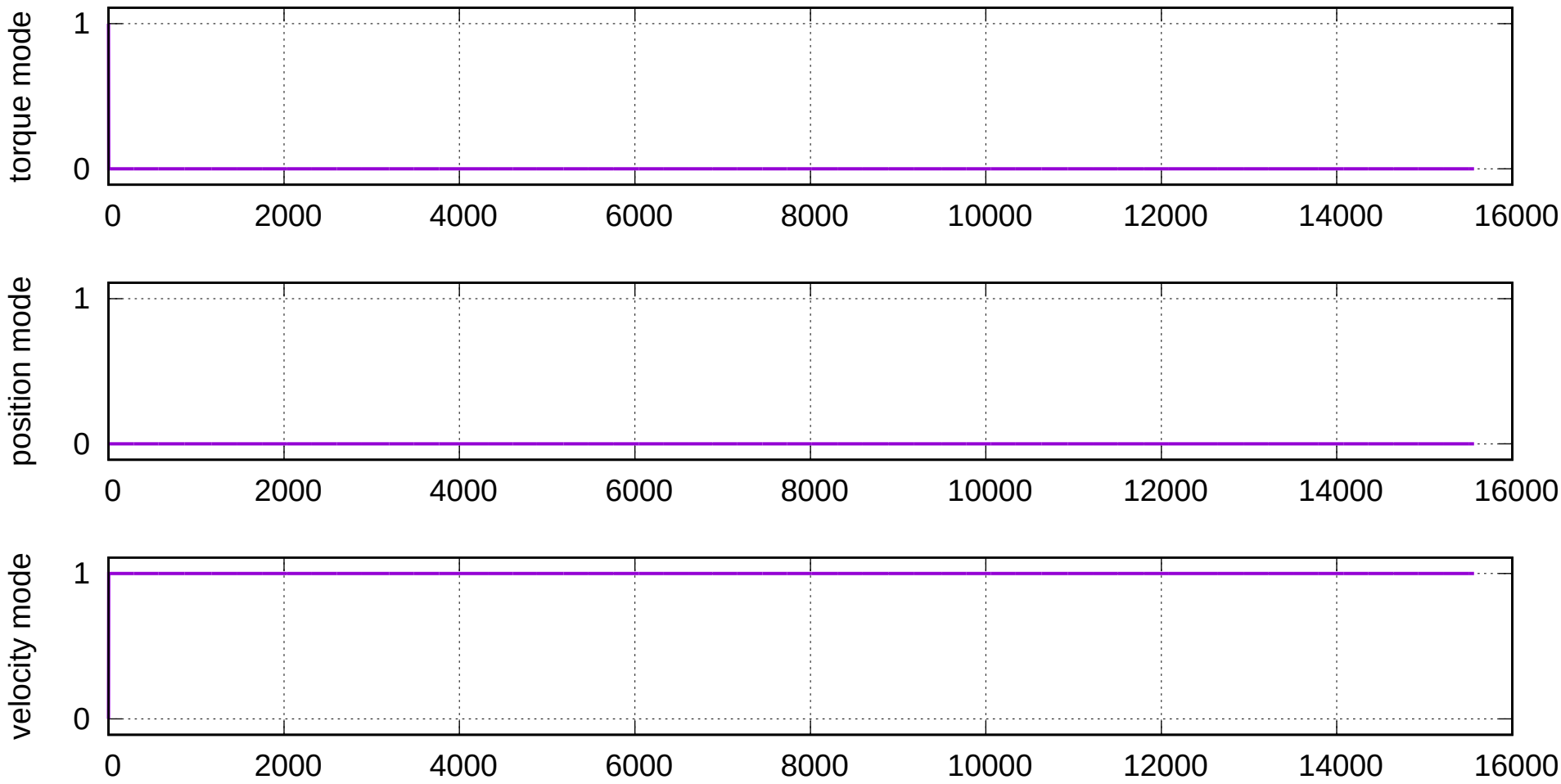

joint velocity
sensed velocity
velocity [rad/s]
time [milliseconds]
5
4
3
2
1
0
-1
-2
-3
-4
-5
0
2000
4000
6000
8000
10000
12000
14000
16000

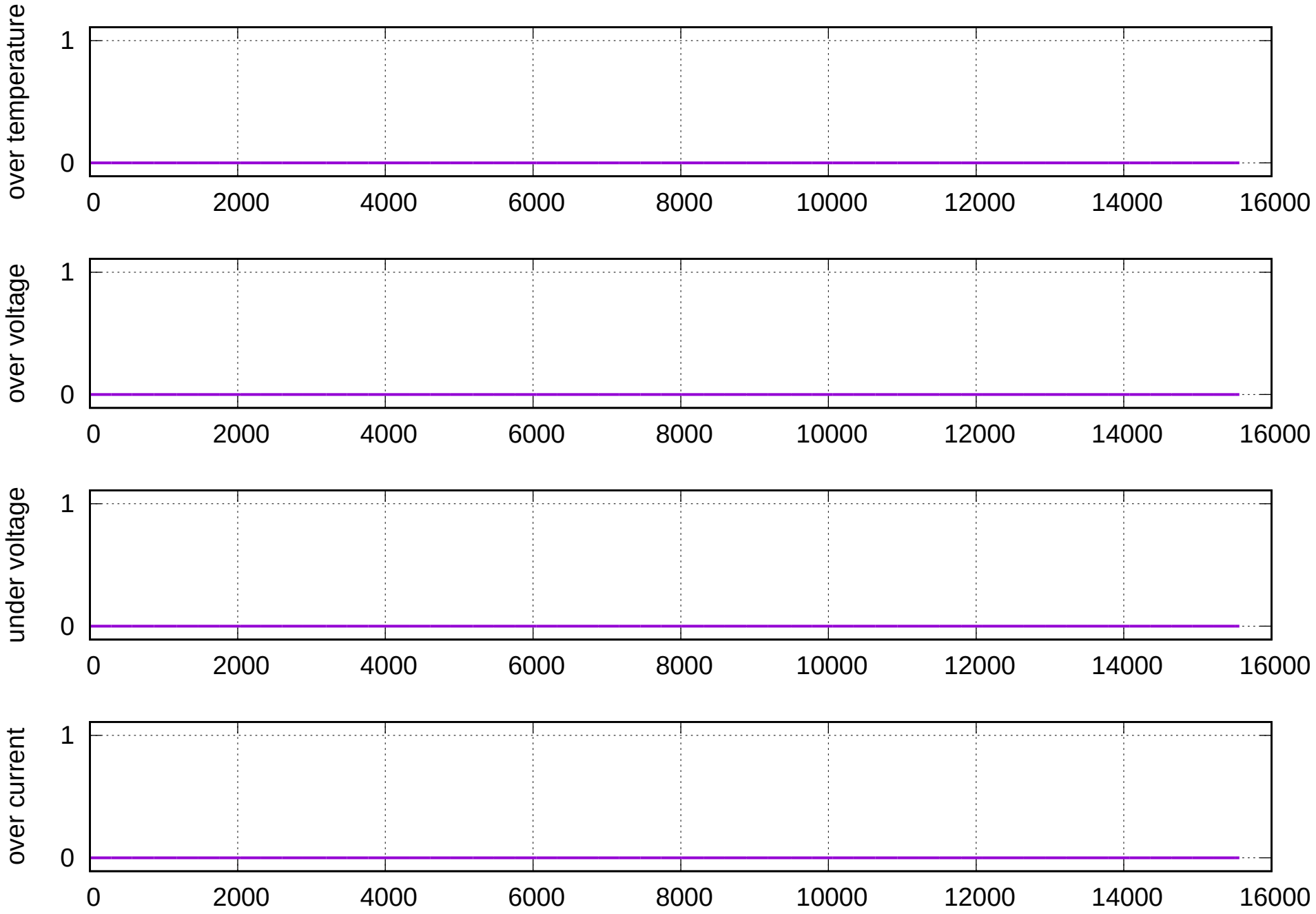

joint rounds per minute
rpm setpoint
sensed rpm
rpm
time [milliseconds]
1500
1000
500
0
-500
-1000
-1500
0
2000
4000
6000
8000
10000
12000
14000
16000

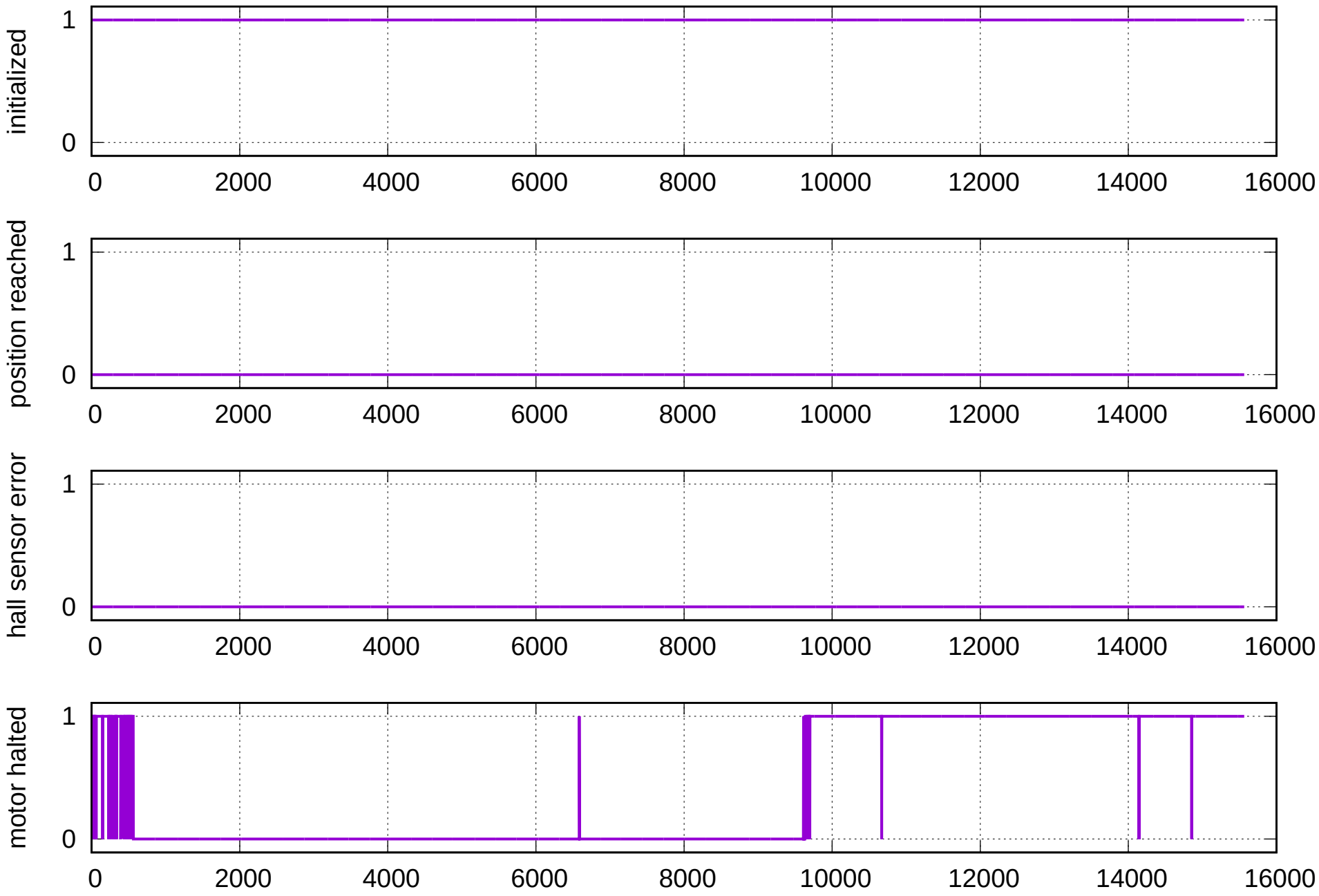

joint current
current setpoint
sensed current
current [ampere]
time [milliseconds]
4
3
2
1
0
-1
-2
-3
-4
0
2000
4000
6000
8000
10000
12000
14000
16000

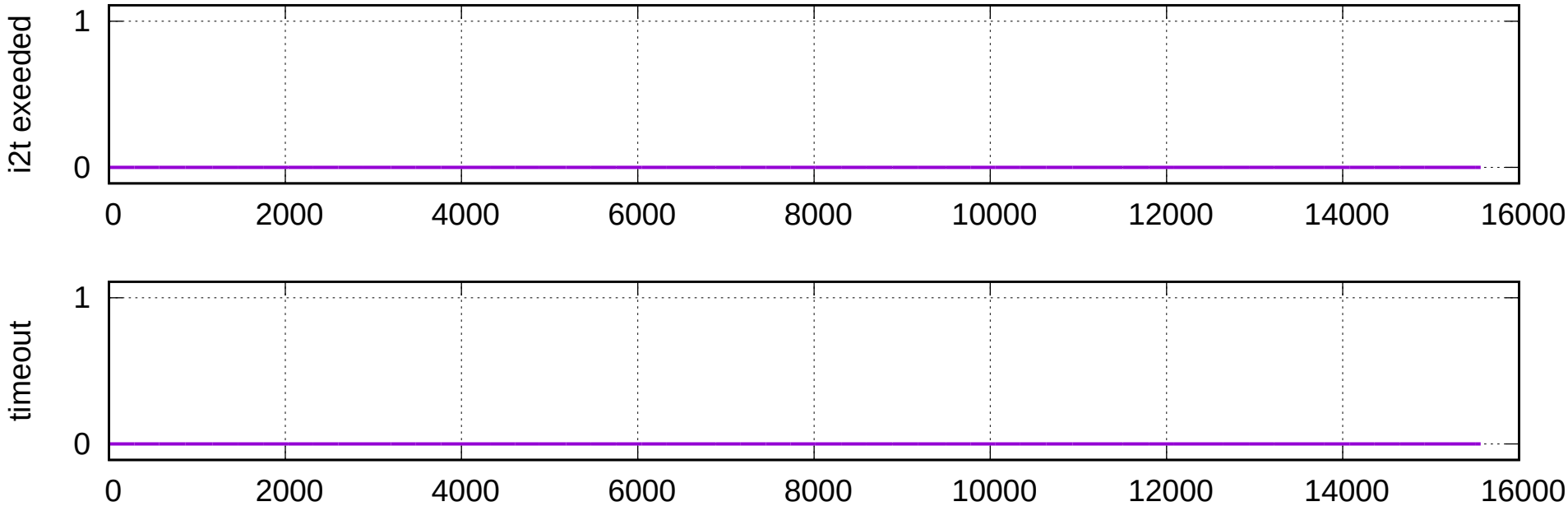

joint torque
sensed torque
torque [Nm]
time [milliseconds]
3
2
1
0
-1
-2
-3
0
2000
4000
6000
8000
10000
12000
14000
16000


ramp generator velocity setpoint
ramp generator velocity setpoint
velocity setpoint
time [milliseconds]
5
4
3
2
1
0
-1
-2
-3
-4
-5
0
2000
4000
6000
8000
10000
12000
14000
16000


torque mode
1
0
0
2000
4000
6000
8000
10000
12000
14000
16000
position mode
1
0
0
2000
4000
6000
8000
10000
12000
14000
16000
velocity mode
1
0
0
2000
4000
6000
8000
10000
12000
14000
16000


over temperature
1
0
0
2000
4000
6000
8000
10000
12000
14000
16000
over voltage
1
0
0
2000
4000
6000
8000
10000
12000
14000
16000
under voltage
1
0
0
2000
4000
6000
8000
10000
12000
14000
16000
over current
1
0
0
2000
4000
6000
8000
10000
12000
14000
16000


initialized
position reached
hall sensor error
motor halted
1
0
0
2000
4000
6000
8000
10000
12000
14000
16000


i2t exeeded
1
0
0
2000
4000
6000
8000
10000
12000
14000
16000
timeout
1
0
0
2000
4000
6000
8000
10000
12000
14000
16000