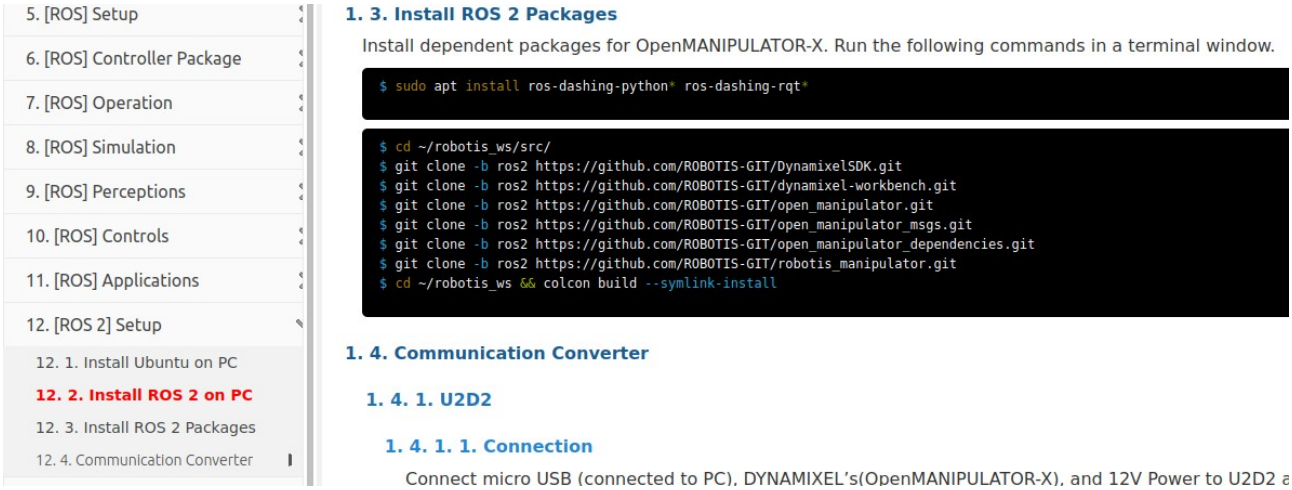
Manipulator E-manual
로보티즈 - 오픈매니퓰레이터 - 'rm-x52-tnm' - e 매뉴얼
https://emanual.robotis.com/docs/en/platform/openmanipulator_x/overview/

[매뉴얼 12.3]



ctrl+alt+T　　터미널열기
cd
ls
sudo apt install ros-dashing-python* ros-dashing-rqt*

cd colcon_ws/src
pwd
git clone -b ros2 https://github.com/ROBOTIS-GIT/DynamixelSDK.git
git clone -b ros2 https://github.com/ROBOTIS-GIT/dynamixel-workbench.git
git clone -b ros2 https://github.com/ROBOTIS-GIT/open_manipulator.git
git clone -b ros2 https://github.com/ROBOTIS-GIT/open_manipulator_msgs.git
git clone -b ros2 https://github.com/ROBOTIS-GIT/open_manipulator_dependencies.git
git clone -b ros2 https://github.com/ROBOTIS-GIT/robotis_manipulator.git
　　# cd ~/robotis_ws && colcon build --symlink-install
cd ..
colcon build --symlink-install　　# build 후엔 bashrc 하기..(밑에 있음)

cd /dev　　# 장치파일 위치
pwd
ls
　　# usb 케이블을 통해 시리얼 통신을 함 -> tts 파일들
ls ttyUSB*
　　# 연결된 usb 케이블번호 확인　　# ls -l *dev*ttyUSB*
　　# 매니퓰레이터는 USB0 으로 설정되어있음

source ~/.bashrc　　# build 를 하면 bashrc 를 하자

cd
cd colcon_ws/src/open_manipulator
ros2 run open_manipulator_x_controller create_udev_rules

[매뉴얼 13.1]

1. 1. Launch Controller

If you are using `U2D2` as a communication converter, open a terminal then enter the following command.

```
$ ros2 launch open_manipulator_x_controller open_manipulator_x_controller.launch.py
```

gedit ~/.bashrc

bashrc 파일에서 131 번줄 도메인 ID 수정 -> 각자 다른걸로... 나는 3 번

source ~/.bashrc

장비(매니퓰레이터) 전원켜기

```
ros2 launch open_manipulator_x_controller open_manipulator_x_controller.launch.py
```

터미널 새로 열기(ctrl+alt+T)

ros2 topic pub /option std_msgs/msg/String "data: print_open_manipulator_x_setting"

[매뉴얼 14.2]

1. 2. 1. Keyboard

TIP: Terminal can be found with the Ubuntu search icon on the top left corner of the screen. Shortcut key for Terminal is `Ctrl`+`Alt`+`t`.

Launch `open_manipulator_x_teleop_keyboard` node for simple teleoperation test using the keyboard.

```
$ ros2 run open_manipulator_x_teleop open_manipulator_x_teleop_keyboard
```

터미널 새로 열기(ctrl+alt+T)

ros2 run open_manipulator_x_teleop open_manipulator_x_teleop_keyboard