

1) Calibrate and test the ReFlex pressure sensors

[Introducing the ReFlex Hand](#) » [Reflex Documentation](#) » 1) Calibrate and test the ReFlex pressure sensors

The next tutorial is [2\) Configure the pressure sensors](#)

Looking at raw pressure values

After going through the quickstart process, you should have a reflex_msgs/Hand message being published on the /hand_state topic. You can find all of the relevant hand data on that topic, from joint angles to pressure sensor values. Once your hand is plugged in to power and your computer via ethernet, run the full reflex roslaunch file and echo the topic.

```
roslaunch reflex reflex_takktile.launch
(in a new terminal)
rostopic echo /reflex_takktile/hand_state
```

```
~ $
~ $ rostopic echo /reflex_takktile/hand_state
finger:
-
  proximal: -0.0496921911836
  distal_approx: 46.6163902283
  contact: [False, False, False, False, False, False, False, False, False]
  pressure: [-29.0, -34.0, -32.0, -32.0, -33.0, -26.0, -30.0, -34.0, -21.0]
-
  proximal: -0.0347870439291
  distal_approx: 0.0
  contact: [False, False, False, False, False, False, False, False, False]
  pressure: [0.0, -8.0, -12.0, -8.0, -5.0, -14.0, -3.0, -8.0, -8.0]
-
  proximal: -0.136105000973
  distal_approx: 45.0775871277
  contact: [False, False, False, False, False, False, False, False, False]
  pressure: [-21.0, -14.0, -12.0, -11.0, -18.0, -21.0, -22.0, -16.0, -12.0]
motor:
-
  joint_angle: 46.56696167
  raw_angle: 14020.0
  velocity: 0.0
  load: 0.0
  voltage: 122.0
  temperature: 27
  error_state: 0x00
-
  joint_angle: -40.3384284973
  raw_angle: 13285.0
  velocity: 0.0
  load: 0.0
  voltage: 120.0
  temperature: 27
  error_state: 0x00
-
  joint_angle: 44.9414825439
  raw_angle: 14015.0
  velocity: 0.0
  load: 0.0
  voltage: 122.0
```

You should see a stream of finger joint values and pressure sensor values. If you just want to view the tactile values, or the echo is going off the screen, try

```
rostopic echo /reflex_takktile/hand_state/finger
```

```
~ $
~ $ rostopic echo /reflex_takktile/hand_state/finger
-
  proximal: -0.0508423224092
  distal_approx: 46.6175384521
  contact: [False, False, False, False, False, False, False, False, False]
  pressure: [-28.0, -33.0, -30.0, -31.0, -33.0, -25.0, -29.0, -34.0, -20.0]
-
  proximal: -0.0332530587912
  distal_approx: 0.0
  contact: [False, False, False, False, False, False, False, False, False]
  pressure: [0.0, -8.0, -11.0, -8.0, -5.0, -14.0, -3.0, -7.0, -8.0]
-
  proximal: -0.136488854885
  distal_approx: 45.0779724121
  contact: [False, False, False, False, False, False, False, False, False]
  pressure: [-21.0, -13.0, -12.0, -11.0, -18.0, -20.0, -22.0, -16.0, -12.0]
-
  proximal: -0.0508423224092
```

Zeroing the pressure values

The pressure values that you see are probably non-zero when unloaded (notice the range of values in the terminal screenshot above). The pressure sensors are very sensitive, and they have a tendency to drift with temperature and other variables. To combat this, standard procedure is to zero the sensors when you know they're unloaded. The more frequently you do this, the less likely you are to encounter troublesome drift — we have found zeroing the tactile values just before grasping to be an effective approach. The pressure sensors on the ReFlex hands work well for detecting contact, in general, but do a poor job of measuring absolute force on a finger.

How to zero the values: first, look at the available services

```
(in a new terminal)
rosservice list
```

You should see a `/reflex_takktile/calibrate_tactile` service. Call it

```
rosservice call /reflex_takktile/calibrate_tactile
```

When you check the terminal that is still echoing the `/hand_state` topic, your tactile values should be hovering around zero.

```
proximal: -1.06273174286
distal_approx: 43.2208518982
contact: [False, False, False, False, False, False, False, False, False]
pressure: [0.0, 1.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]

proximal: 0.212471365929
distal_approx: 0.0
contact: [False, False, False, False, False, False, False, False, False]
pressure: [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]

proximal: -3.25722718239
distal_approx: 43.8895454407
contact: [False, False, False, False, False, False, False, False, False]
pressure: [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]
...
```

What's actually happening

When you call the `/calibrate_tactile` service the current tactile values are grabbed and saved, and become the new reference point from which to create a relative pressure value. If you call `/calibrate_tactile` while there's any pressure on the pads, the hand will not be correctly calibrated, and will show negative pressure when the grip is released.

Keep on going to [2\) Configure pressure sensors](#)

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