# Data Collection Tutorial -
# SCHUNK ATI FT34898 Force/Torque Sensor

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# Introduction

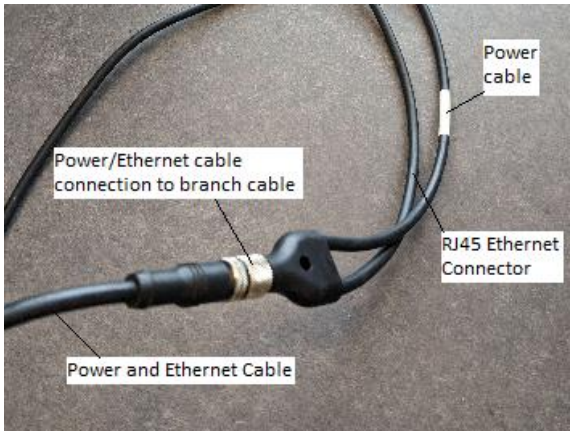
This guide is intended to walk you through the process of setting up and utilizing the force/torque (F/T) sensor connected to the UR10e robot in our laboratory. This manual will provide you with the necessary knowledge and instructions to successfully configure the F/T sensor and collect valuable force data.

Throughout this manual, I will outline the procedures and configurations that worked for me, offering insights and tips based on my experience. By following these instructions, you will have a solid starting point to set up the F/T sensor and collect force data effectively. However, please be aware that individual circumstances may vary, and you may encounter unique challenges or requirements that are not addressed explicitly in this manual.

To ensure a successful setup, it is recommended to consult the Ethernet Axia80 F/T Manual documentation from the ATI website (https://www.ati-ia.com/products/ft/ft_literature.aspx). Additionally, if you have access to experts or support personnel familiar with the specific F/T sensor and UR10e robot in the lab, I encourage you to seek their guidance and expertise to address any potential issues that may arise.

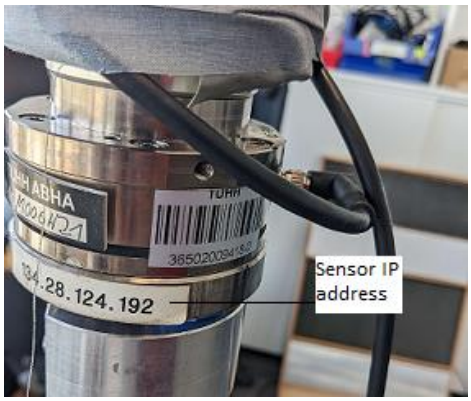
## Power supply and Ethernet connection

1. The sensor comes with a Power and Ethernet Cable with a branch cable for power supply and RJ45 connection. Connect the Power and Ethernet cable to the sensor's M8 connector.
2. Connect the branched cable to the cable from step 1.
3. Connect the branched cable to the power supply.
4. Connect the RJ45 connection to your computer's LAN port (ensure no other LAN connection is connected to the computer). This will make the sensor's 1st LED (Link/Activity) and 3rd LED (Status) to light up. If the LEDs don't light up, ensure if the power cable/Ethernet cable is properly connected and the UR10e robot is turned on via Teach Pendent.

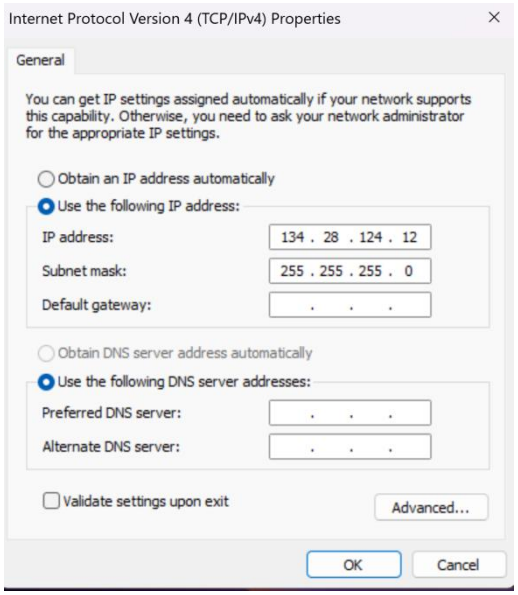



## Setting up connection between sensor and PC

1. Find the sensor's default IP address from the label on the side of the sensor. As per image below, let's consider the sensor Static IP address is 134.28.124.192. *Note: If you cannot find the label for the sensor IP address, refer to* ***step 7*** *from* ***Setting up ATI F/T Data Viewer to collect force data*** *section.*



2. On Windows computer, go to **Control Panel -> Network and Internet -> Network and Sharing Center -> Change adapter settings.**
3. Open **Local Area Connection/Ethernet** (the network icon that appears from cable Ethernet connection to PC).
4. A new window opens that displays the general settings for the local area connection link. Click on the **Properties** button.
5. On the **Networking** tab, scroll down and select **Internet Protocol Version 4 (TCP/IPv4)** and open its **Properties.**
6. Record the values and settings shown in the properties window. Save these values so that the computer can be returned to its original configuration later.
7. Select the **Use the following IP address** radio button.
8. Give an IP address where the first three fields are the same as sensor while the fourth one is **not the same as sensor.** For example, if the sensor IP is 134.28.124.192, then the PC network IP can be set as 134.28.124.12 (or any other number 0-255 except 192 in the fourth field).
9. In the subnet mask field, type 255.255.255.0

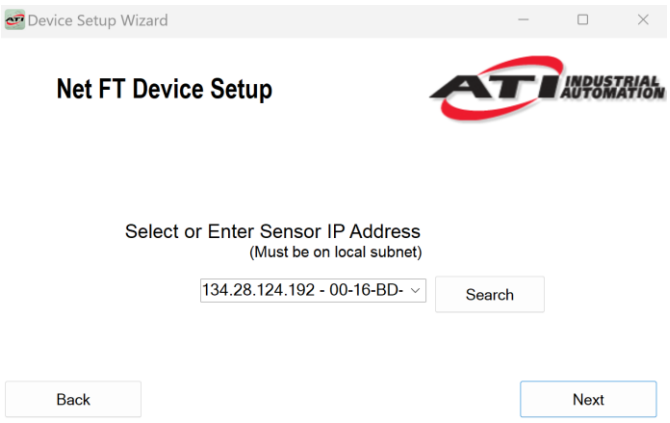



10. Rest of the spaces can be kept empty. Click **OK.**
11. Open a browser and type the sensor IP in the address field. If the Ethernet Axia F/T's welcome page appears, that means the connection between the sensor and PC has been successful.
12. For understanding in-depth about the parameters in the webpage, refer to the manual mentioned in introduction.

# Setting up ATI F/T Data Viewer to collect force data

1. To collect live force data, download **F/T Data Viewer** from ATI website (https://www.ati-ia.com/products/ft/software/net_ft_software.aspx).
2. For in-depth tutorial about the software, consult the official **F/T Data Viewer Manual** from ATI website (https://www.ati-ia.com/products/ft/ft_literature.aspx).
3. Install the software downloaded from step 1.
4. Open the installed **FT Data Viewer** application. The data viewer application will open up but with limited features due to no communication with the sensor yet.


5. Click the **Set up Sensor** button below ATI logo.
6. Set **Net FT** as device type and then click **Next.**
7. Click **Search** for the network to auto-find the IP address of the sensor. This should work as long there is proper connection between the force sensor and the computer while having first and third LED turned on in the sensor.



8. Click **Next.** The F/T Data Viewer should start working successfully allowing user to have access to all functions.
9. Click **Start Reading** to start streaming data from the sensor.
10. To log data, first go under Tools tab and click **Logging Settings.**
11. In the logging settings window, adjust your excel sheet output settings as per your requirement.
12. Before starting logging data, don't forget to click **Bias** to bias off the sensor. *Note: Sometimes, the software might crash when clicking **bias** button. As an alternative way to bias the sensor, open the sensor webpage by typing the sensor IP in a browser. Go to **Snapshot** tab and click **Set User Bias** to set up a new bias. The software will automatically update with the new bias values.*


13. In the software, while press **Start Logging** to start collecting data and alternatively, press **Stop Logging** to stop collecting data. The log gets outputted to a CSV file in directory referred by user at Step 11.

**Notes:**

- For in-depth explanation for the parameters in the CSV file, refer to the official manual from step 2.
- Even though manual suggests dividing the force/torque values by the **counts per unit force/torque** value to obtain true force/torque values, it didn't seem necessary as the CSV file seems to output true force/torque values based on personal experience.
- The **sampling rate** at which chart pulls data from the sensor can be modified under **Settings -> Graph Settings** tab.
- To tweak with ADC sampling frequency and low-pass filter settings, go to the **ADC Settings** tab in the sensor webpage.
- To tweak RDT (raw data transfer) output rate, go to **Communications** tab in the sensor webpage.
- The resolution of sensor force is 0.1 N and torque is 0.005 Nm (Part # SI-500-20).

## Conclusion

The Axia F/T sensor has proven to be a valuable asset in our research, enabling us to gain valuable insights into the forces and torques involved in our experiments. Its high precision, reliability, and ease of use have made it an indispensable tool for our lab work.

The aim of this quick-guide is to get you to speed as soon as possible instead of having to go through multiple resources and tutorials to figure things out. However, an extensive study on the official manuals is still encouraged in order to gain better insights of the sensor.