

6-axis Force/Torque Sensors

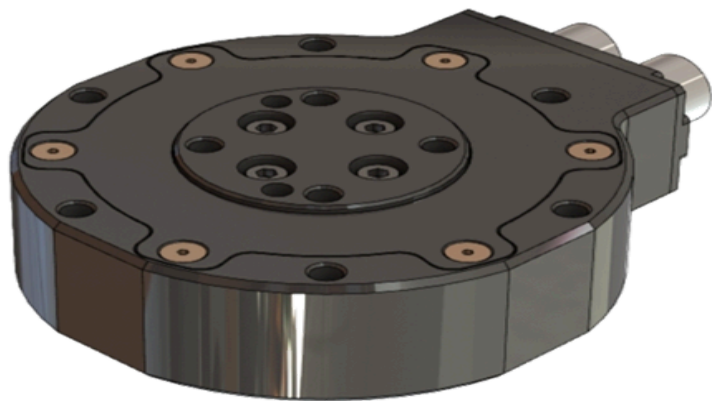
Smart 6-axis Force Torque Sensor, AFT200-D80-EN

Rev. 2026.09.15



Force/Torque sensors user manual

This document is a user manual for AIDIN ROBOTICS
Force/Torque sensors



FOREWORD

Thank you for purchasing our Force Torque sensor. This manual contains the information necessary for the correct use of the AIDIN ROBOTICS AFT200-D80 sensor. Please carefully read this manual when using this software. Please note that the basic performance of the product will not be

exhibited when the robot system is used out of conditions. This manual describes possible dangers and consequences using Force Torque sensor. Be sure to comply with safety precautions written in this manual to use safety and correctly.

NOTICE

This manual Do **NOT** allow copy, reproduction or share without authorization of AIDIN ROBOTICS. Please notify us any errors in this manual or the provided instructions.

MANUFACTURER

AIDIN ROBOTICS

SAFETY PRECAUTIONS

Installation of Force Torque sensor **MUST** be performed by qualified personnel in accordance with national and local codes. Please carefully read this manual when using this software.

WARNING & CAUTION

 This symbol indicates that a danger of possible serious injury or death exists if the associated instructions are not followed properly.

 This symbol indicates that a danger of possible harm to people or physical damage to equipment and facilities exists if the associated instructions are not followed properly.

 AFT200-D80-EN sensor from AIDIN ROBOTICS meets CE-certified "A Class"

1. Introduction

1.1 Smart 6-axis Force Torque Sensor, AFT200-D80



1.2 Key features

- Smart 6-axis force/torque sensor
- All-in-one sensor (No additional amplifier)
- Digital output communications (EtherNET)
- Easy installation and data collection
- Grippers, robot hands, collaborative robot, industrial robot

1.3 Specs.

Index	Unit	Value
Operating voltage	VDC	12
Max. safe excitation voltage	VDC	24
Nominal force range	N	200

Index	Unit	Value
Nominal torque range	Nm	15
Limit force (Fxyz)	N	300
Limit torque	Nm	22.5
Force Resolution	N	0.15
Torque Resolution	Nm	0.015
Force Noise-free resolution (STD)	N	0.4
Torque Noise-free resolution (STD)	Nm	0.025
Maximum sample rate	Hz	1,000
Dimensions	mm	D80 x H21.5
IP rating		IP65
Operating temperature		10-50°C

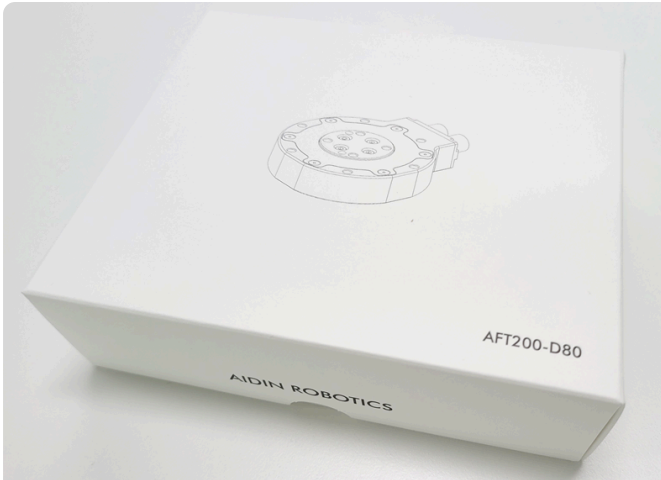
1.4 Flyer

- 📎 [\[AIDIN ROBOTICS\] AFT MINI+AFT200 leaflet\(EN, 25.10\).pdf](#)

2. Installation Guide

2.1 Basic Components

- AFT200-D80 x 1 EA
- 1.5 m Cable x 1 EA



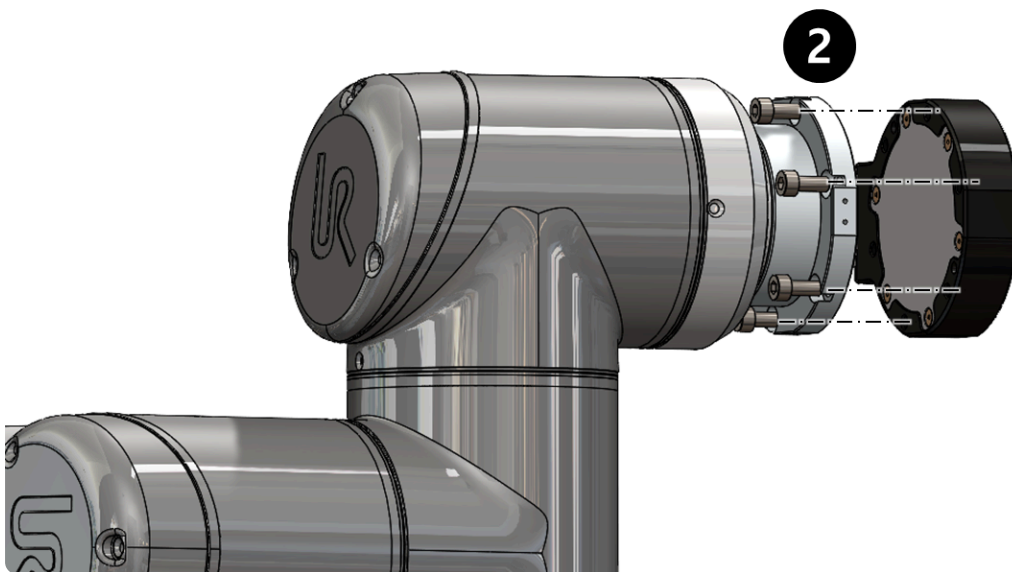
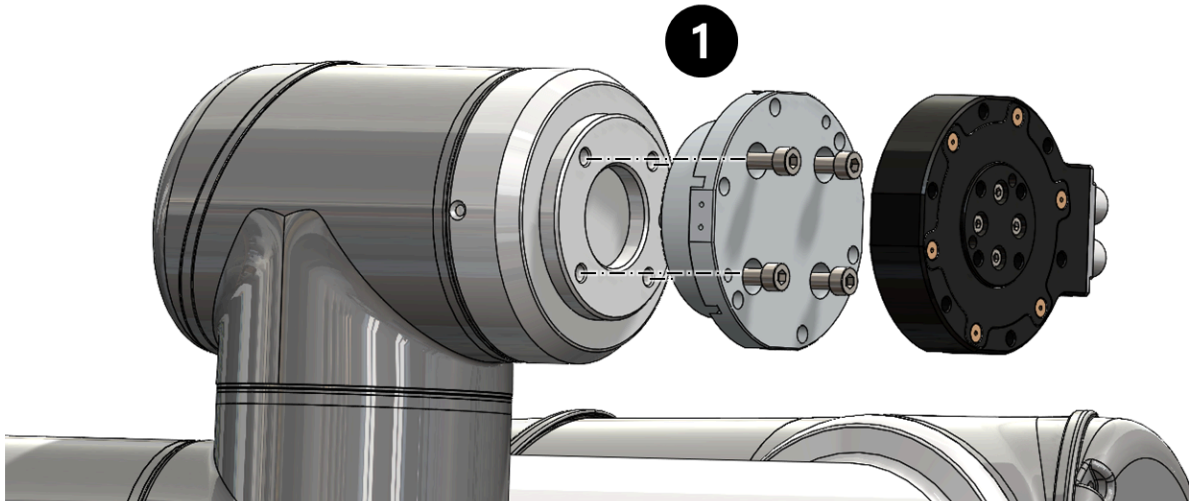
2.2 Mounting

- **M5 bolt 5.2Nm required for tightening**
- Performance cannot be guaranteed and A/S not possible when disassembling internal/external bolts



*Transparent parts are user part examples

- **Sensor tightening order**



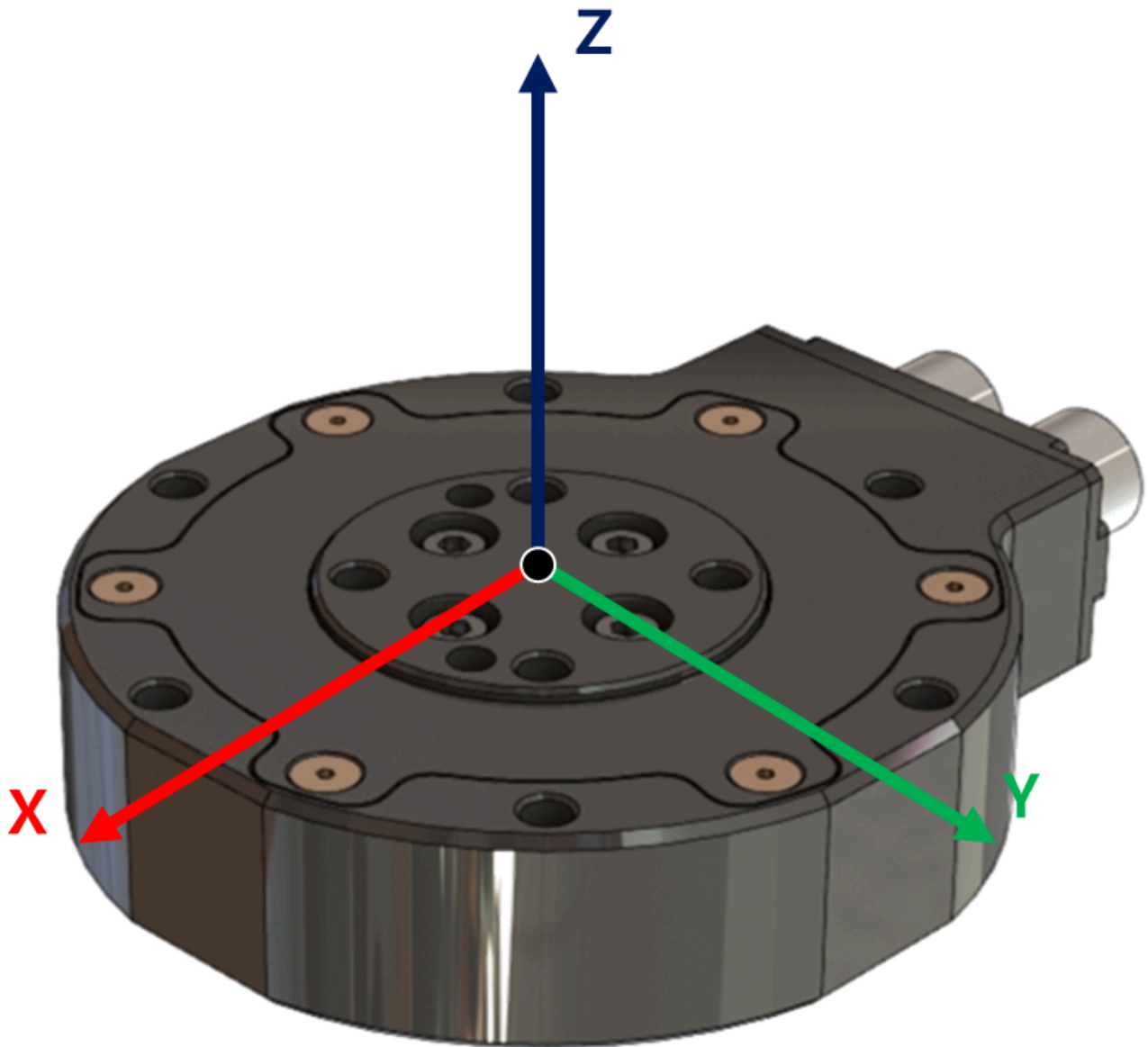
- CAUTION OF CABLE CUTTING AND EXCESS PULLING
- Secure the sensor line with the robot so that it does not pull as it moves
 - Do not fix it to the robot using cable ties, etc., or use cable ties to fix it in a bundle shape like other wires
 - We recommend that you use Velcro to fix it with the robot, and please use Velcro to fix it when fixing it in a bundle form with other lines

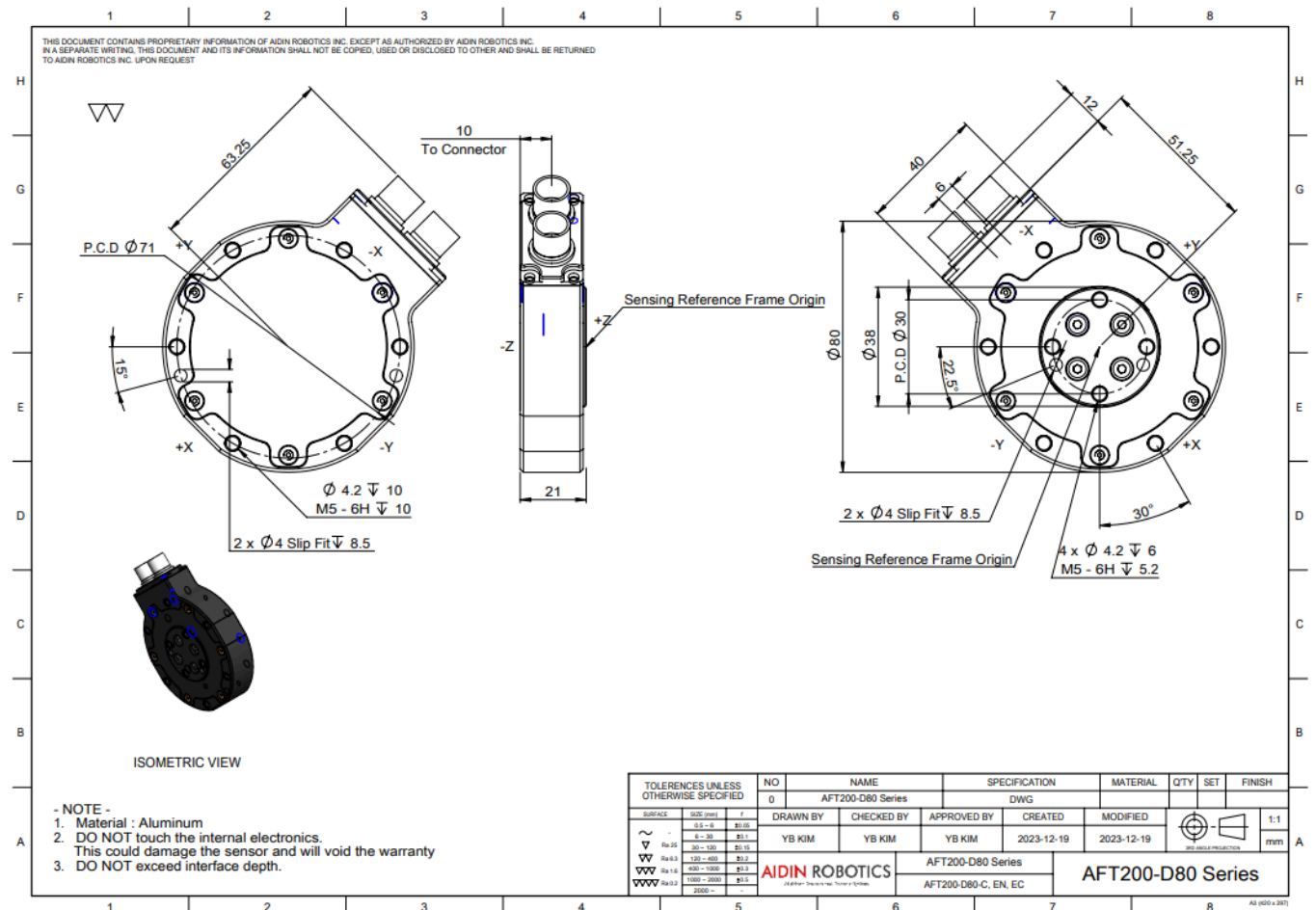
💡 **Performance CANNOT be guaranteed if not followed to the tightening torque guide.**

💡 **If the sensor line is not fixed to the robot, the output signal may have a noise due to the pulled by robot**

💡 Please check More detail setup guide as follow:

2.3 AXIS & Drawings





Drawing File :

- [AFT200_D80.pdf](#)



Port Location Notice

- **EtherCAT** Type model has two ports: **IN** and **OUT**.
- **Ethernet** Type model has one port, located on the **left side**.
- **CAN** Type model has one port, located on the **right side**. STEP File:
- [AFT200-D80-EN_배포용.zip](#)

2.3 Wiring

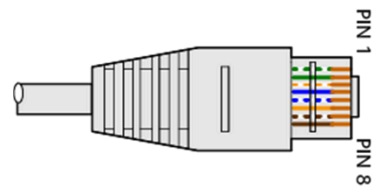
The EtherNET device are provided with a POE injector and a 12-24V AC/DC power supply. The sensor is complying with 802.3af Mode A protocol, but the power is being delivered by **only one unused pair** of the Cat5e ethernet cable. Make sure DO NOT apply the over voltage to the sensor

cable. The user should connect the sensor cable to the "POE" marked port of the injector. Other POE Injectors compatible with the 802.3af Mode A can be used with 12-24V supply voltage.

2.3.1 Pin out



- Use POE Connector to connect Power & EtherNET signal



PIN	Wire	definition
PIN1	Green/White	Tx+
PIN2	Green	Tx-
PIN3	Orange/White	Rx+
PIN4	Blue	Vss+ (12-24V)
PIN5	Blue/White	
PIN6	Orange	Rx-
PIN7	Brown/White	
PIN8	Brown	Vss- (0V)



	Cable wires color	EtherCAT Signal
1	Green/White	TX+
2	Green	TX-
3	Orange/White	RX+
4	Blue	12V
5	Blue/White	NC
6	Orange	RX-

7	Brown/White	NC
8	Brown	GND

2.5 EtherNET interface

The AFT200-D80-EN model support the RUN state where the sensor is providing the force/torque measurements. Also the IMU measurements can be activated by using activating signal to AFT200-D80-EN sensor. To activate the IMU signal or biasing the sensor signal, please follow the instructor in section 2.6. The EtherNET interface is used to give the users the following capabilities: • Read the Product Number, Serial Number, etc. • Read Force/Torque Data • Read IMU data

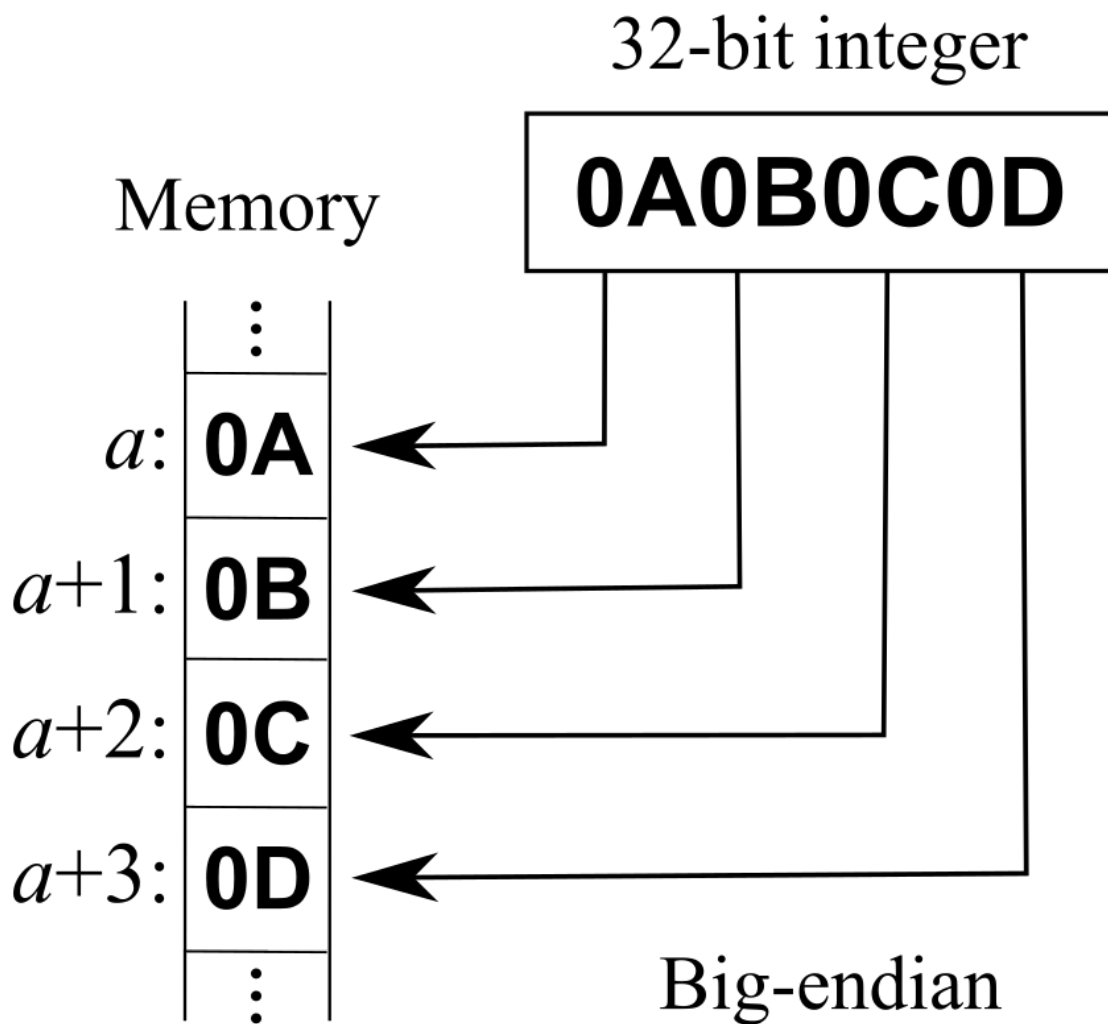
2.5.1. Digital Output

Name	Type	Size	Bit Size
Force x	REAL		32
Force y	REAL		32
Force z	REAL		32
Torque x	REAL		32
Torque y	REAL		32
Torque z	REAL		32
Acceleration x	REAL		32
Acceleration y	REAL		32
Acceleration z	REAL		32

Angular Rate x	REAL	32
Angular Rate y	REAL	32
Angular Rate z	REAL	32
Temperature	REAL	32

2.5.2. Output type

- The sensor output is in big-endian format. Please convert the final value to float using big-endian before use.



ex) $F_x = '3F4C03DD'$

Float - Big Endian (ABCD)			
#	Raw	Float	
0	3F 4C 03 DD	0.796933949	▲



To stabilize the sensor signal, it is recommended to have a running time of about **30 minutes.

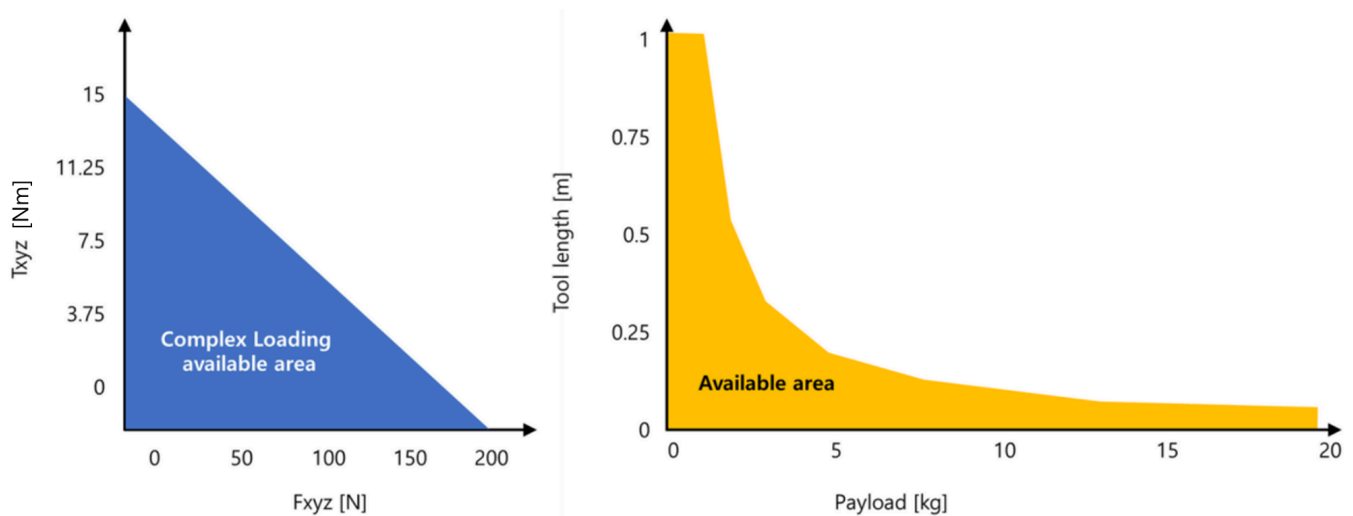
*** Please leave the sensor data on for at least 10 minutes before using it**



The first 10 minutes of sensor output data can cause data to flow.

2.6 Force/Torque Out of Range

The sensor can operate up to its nominal capacity, while a single axis load. On Nominal capacity reading is incorrect and invalid. The nominal capacity of composite loading is The following diagram illustrates a complex loading scenario. The sensor cannot operate outside the normal operating area



The following graph shows the range of payloads and tool lengths that can be used with AFT200-D80-EN sensor for applications requiring high or moderate precision.

- The total percentage of the calibrated range used by Fxy and Tz axes is greater than 105%. Refer to the following Fxy, Tz equation.

$$\sqrt{F_x^2 + F_y^2} / F_{xy} \text{ Range} + |T_z| / T_z \text{ Range} > 105\%$$

- The total percentage of the calibrated range used by Fz and Txy axes is greater than 105%. Refer to the following Fz, Txy equation.

$$\sqrt{T_x^2 + T_y^2} / T_{xy} \text{ Range} + |F_z| / F_z \text{ Range} > 105\%$$

3. WebServer

3.1 . Connecting Through Ethernet Different methods for setting an IP address and how to configure a Windows® 10 operating system to connect the sensor to the AFT200-D80-EN webserver. To connect through Ethernet, the user must configure the IP address setting of the AFT200-D80-EN sensor. The sensor can connect through Ethernet by one of the following options:

1. Connect the Ethernet cable into a port of an Ethernet switch.
2. Connect the Ethernet cable directly to a computer's Ethernet interface.

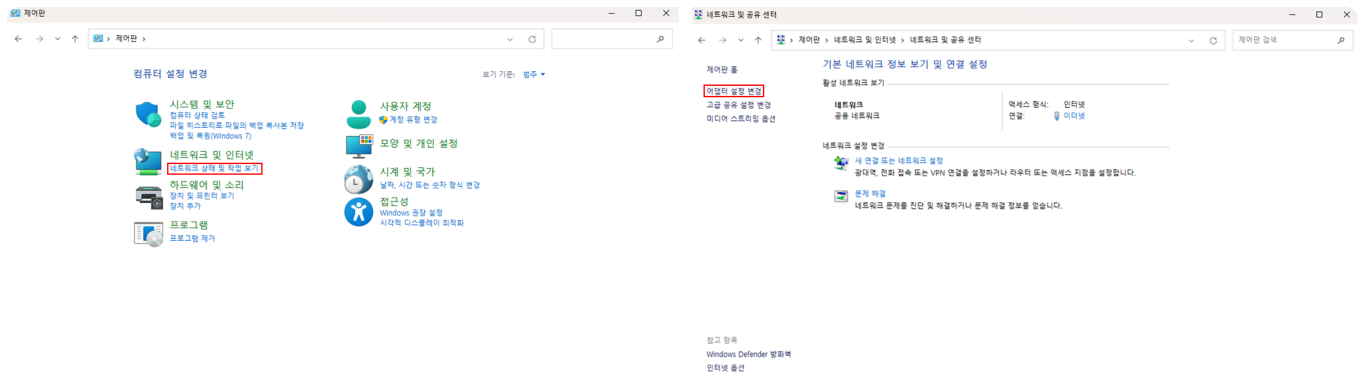
3.2 IP Address Configuration for Ethernet Configure an IP address for the AFT200-D80-EN sensor with one of the following methods: Method 1: Set the IP address to a static value stored on the Communication Settings web page. Method 2: The DHCP server assigns an IP address. The initial setting of AFT200-D80-EN sensor is set as static IP address set to 192.168.1.199. (*If the initial IP address is not working, please try again with this IP address: 192.168.1.182. or 192.168.1.100.) If the user wants to change the IP address to DHCP or other Static IP, please enter the Webserver of AFT200-D80-EN (Initial address: 192.168.1.199.) than change the IP address refer to Section 3.3.

3.3 Connecting To the AFT200-D80-EN Webserver Using a Windows Computer To initially access the AFT200-D80-EN webserver, configure the sensor to work on the network by assigning an IP address and provide basic information about the network. For the initial connection, directly connect the computer to the sensor and disconnect from LAN. The sensor's default IP address is 192.168.1.199.



Temporarily change the computer's Ethernet adapter to a static IP address with the same first three fields as the sensor, for example: 192.168.1.220.

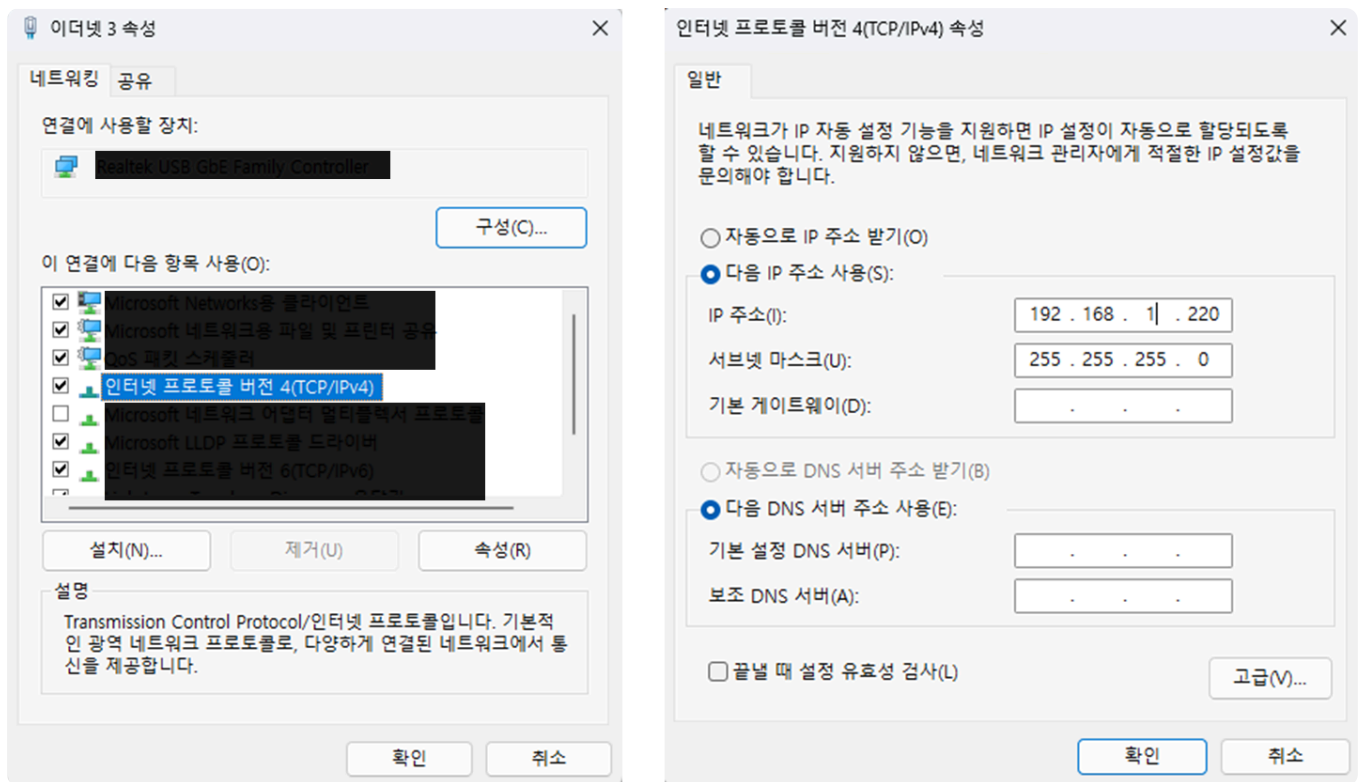
1. Disconnect the Ethernet cable from the LAN port on the computer.
2. Open the computer's Internet Protocol (TCP/IP) Properties window:
3. From the Start menu, select the Control Panel.
4. Click on the **Network and Internet** icon.
5. Click on the **Network and Sharing Center** icon.
6. Click on the View **network status and tasks** link.
7. Click on the **Local Area Connection** link.



6. Click on the **Properties** button.

7. On the Networking tab, and select **Internet Protocol Version 4 (TCP/IPv4)**

8. Click on the **Properties** button



1. Select the Use the following IP address radio button.

2. In the **IP address**: field, type **192.168.1.220** (Temporarily).

3. In the **Subnet mask** field, type **255.255.255.0**.

4. Click on the **OK** button.

5. On the **Local Area Connection Properties** window, click the **Close** button.

6. Type the address 192.168.1.199 in the browser. The AFT200-D80-EN sensor's Welcome page appears. (*If the initial IP address is not working, please try again with this IP address: 192.168.1.182. or 192.168.1.100.)

7. On the left side of the page, there is a menu bar that link to change the valuables of AFT200-D80-EN sensor. Click on the **"System Setting"** button.

System settings

Communication

IP Configuration:

DHCP

IP Address

192.168.1.163

Subnet Mask

255.255.255.0

Gateway

192.168.1.1

Gateway

18:31:4F:00:00:01

SAVE SETTING

1. Select an IP address mode:

- For a static IP address, enter the appropriate values for the IP address, subnet mask, and default gateway. Click the "SAVE SETTING"
- For DHCP, click the Enabled Combo Box to DHCP, and then click the "SAVE SETTING" button at the bottom of the page. If the Setting is successfully saved, "Set IP to DHCP successfully. Auto reboot device." message will be shown below.

1. Open up a new web browser window. Type the sensor's IP address into the browser's address bar, and press Enter.

4. Configuring the Sensor with the AFT200-D80-EN Webserver

The AFT200-D80-EN Sensor web server provides full configuration options for the sensor. The menu bar on the left side of the website has a button that leads to the settings page. Web servers use simple HTML browser scripting and do not require plug-in technology. Non-critical user interface features are unavailable when browser scripting is disabled.

4.1 Welcome Page When the user enters the sensor's IP address into the browser address field, the Ethernet F/T Welcome page appears. The Welcome page gives an overview of the AFT200-D80-EN main functions. The bottom of the page lists the calibration used by this configuration.

AFT SERIES

SMART 6-Axis Force Torque Sensor

System status: healthy
Sensor temperature: 34.3

Name	Version	S/N	P/N	Rev
AFT200-D80-EN	1.0.1	SSAE23FE008	00813	1

Welcome

AFT200-D80-EN is designed to measure forces and torques in Cartesian coordinates, specifically **F_x** (force in the x-axis), **F_y** (force in the y-axis), **F_z** (force in the z-axis), **T_x** (torque around the x-axis), **T_y** (torque around the y-axis), and **T_z** (torque around the z-axis). With the **AFT Sensor Interface** you can conveniently view sensor data, set parameters, access system information, and configure communications with the sensor.

Sensor Data Page

The Sensor Data page allows you to monitor force and torque data. You can observe the values of **F_x**, **F_y**, **F_z**, **T_x**, **T_y** and **T_z** at the time of the loading of this web page. This data is crucial for analysis, control, and decision-making in various applications.

Parameter Settings Page

On the Parameter Settings page, you can configure the behavior of the **AFT Sensor**. You can change the **EtherNET** network settings and filter options and set the output rate according to your specific requirements.

Real-time Monitoring page

- Real-time Display:** The application graphically represents sensor readings, allowing you to observe changes and fluctuations as they happen. The bar graph provides a clear visualization of the loading levels, while the 3D cube offers a more immersive and intuitive representation of the forces and torques.

4.2 Sensor Data Page This page displays the current sensor loading conditions. The information on the Sensor Data page is static and becomes current after a user loads or reloads the page.

System status: healthy
Sensor temperature: 34.3

Name	Version	S/N	P/N	Rev
AFT200-D80-EN	1.0.1	SSAE23FE006	00613	1

Sensor Data

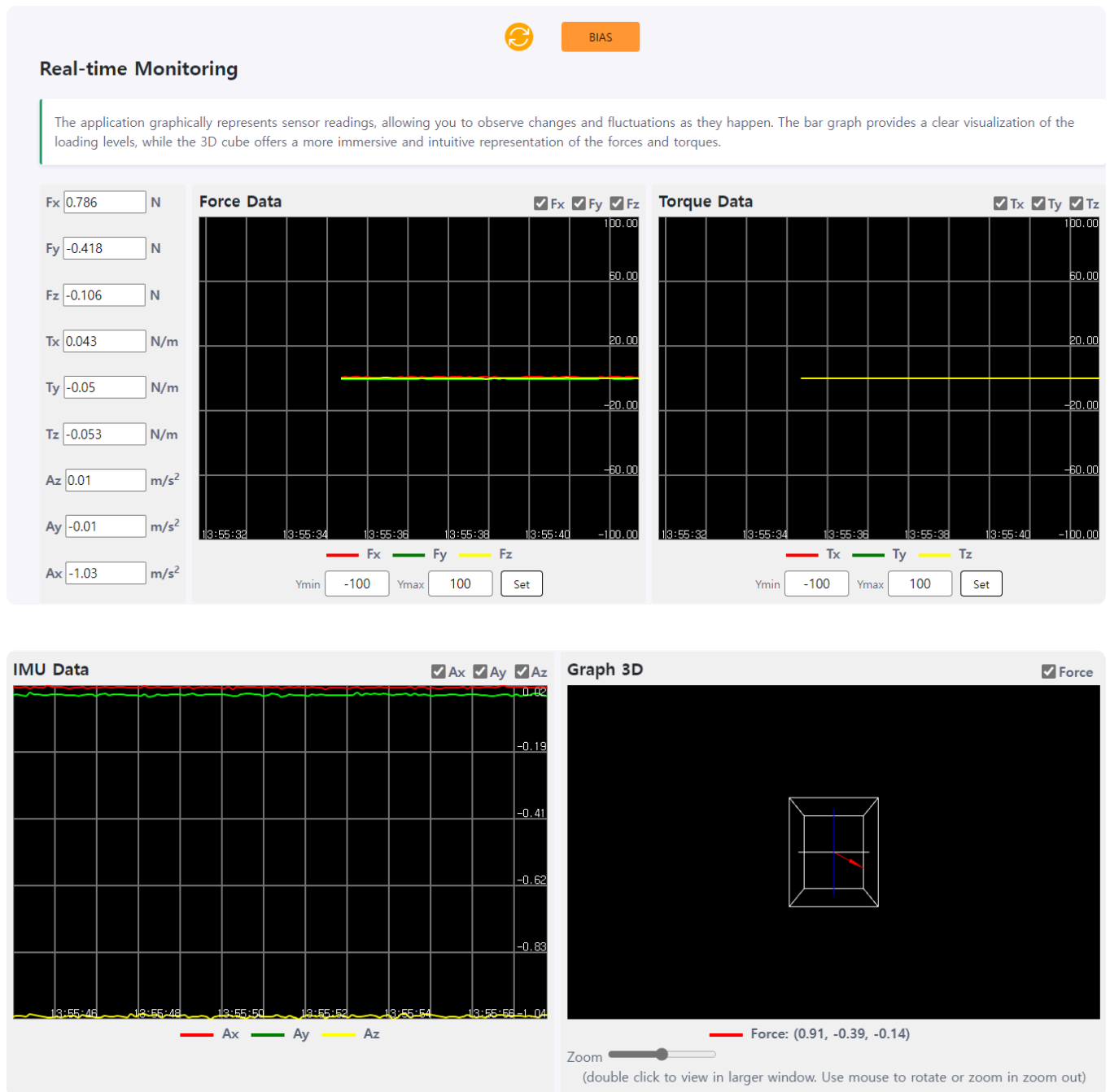
The Sensor Data page allows you to monitor force and torque data (User setting units). You can observe the values of **F_x**, **F_y**, **F_z**, **T_x**, **T_y**, and **T_z** at the time of the loading of this web page. This data is crucial for analysis, control, and decision-making in various applications.

LoadTracker

	F _x	F _y	F _z	T _x	T _y	T _z	A _x	A _y	A _z
Sensor Data	0.595	-0.398	0.24	0.04	-0.033	-0.027	0.011	-0.013	-1.029
Min value	-427.676	-0.681	-15.311	-0.1	-0.139	-0.048	-44.891	-0.021	-32.767
Max value	0.907	374.339	5299.243	17.79	32.174	20.535	0.019	10.813	0

6.6 Real-time Monitoring Page This page shows real-time F/T data from the AFT200-D80-EN sensor. FT and Acceleration values, and Force/Torque data are shown on the left. Acceleration values and force vector directions are shown below

The force/torque range of the graph can be changed by entering maximum and minimum values at the bottom of the graph



6.7 System settings Page On the System setting page, users can view and edit Ethernet networking options on the system. Typically, these settings are set once when the user first sets up the system and do not need to be changed later. Here is a detailed overview of how to set up Ethernet communications with sensors

System settings

Communication

IP Configuration:	DHCP ▼
IP Address	192.168.1.163
Subnet Mask	255.255.255.0
Gateway	192.168.1.1
Gateway	18:31:4F:00:00:01

SAVE SETTING

The fields in Figure of the System setting page are described as follows: **Ethernet network settings:** IP Configuration: Users can set either DHCP or Static IP addresses. IP Address : The user can set the sensor's IP address Subnet Mask: This field is for the subnet mask portion of the IP address. (default 255.255.255.0.) Users should contact their IT department to determine what static conditions they are in the IP subnet mask to be assigned. Gateway: You know the default gateway to assign.

5. Operation Commands



To stabilize the sensor signal, it is recommended to have a running time of about **30 minutes.

* P**lease leave the sensor data on for at least 10 minutes before using it



The first 10 minutes of sensor output data can cause data to flow.

1. UDP Communications

2. Transmitting mode 1. Transmit data "00 03 02" in HEX form to the sensor

ASCII	00 03 02					✕	
HEX	00 03 02					✕ Load File	
Address	192.168.1.199	✕	Port	8890	✕	Resend Delay	0 ✕
						UDP	Send Save

2. The upper Address "192.168.1.199" is PC IP address (**Please use the last address "199" by arbitrarily changing it to the address set on your PC)**
3. Please the transmit Port as "***8890**"
4. The received data is **52 bytes** in total, and the values of "***Fx, Fy, Fz, Tx, Ty, Tz, Ax, Ay, Az, Gx, Gy, Gz**", Temp" are outputted in **4 bytes** each in the order in which they are received.
5. and the output **4-byte** data must be interpreted and used in a big-endian

2. Stop mode 6. Transmit data "00 03 03" in HEX form to the sensor

ASCII	00 03 03					✕	
HEX	00 03 03					✕ Load File	
Address	192.168.1.199	✕	Port	8890	✕	Resend Delay	0 ✕
						UDP	Send Save

3. Bias mode 7. Transmit data "00 03 04" in HEX form to the sensor

ASCII	00 03 04					✕	
HEX	00 03 04					✕ Load File	
Address	192.168.1.199	✕	Port	8890	✕	Resend Delay	0 ✕
						UDP	Send Save

1. TCP/IP Communications

2. Transmitting mode 1. Transmit data "00 03 02 " in HEX form to the sensor

ASCII	00 03 02 c0 a8 01 dc 0f a1					✕	
HEX	00 03 02 c0 a8 01 dc 0f a1					✕ Load File	
Address	192.168.1.199	✕	Port	80	✕	Resend Delay	0 ✕
						TCP	Send Save

2. The upper Address "192.168.1.199" is PC IP address (**Please use the last address "199" by arbitrarily changing it to the address set on your PC)**
3. Please the transmit Port as "***80**"
4. The received data is **52 bytes** in total, and the values of "***Fx, Fy, Fz, Tx, Ty, Tz, Ax, Ay, Az, Gx, Gy, Gz**", Temp" are outputted in **4 bytes** each in the order in which they are received.
5. and the output **4-byte** data must be interpreted and used in a big-endian

2. Stop mode 6. Transmit data "00 03 03" in HEX form to the sensor

ASCII
W00W03W03Wc0Wa8W01WdcW0fWa1

HEX
00 03 03 c0 a8 01 DC 0F A1

Address
192,168,1,199
Port
80
Resend Delay
0
TCP
Send
Save

3. Bias mode 7. Transmit data "00 03 04" in HEX form to the sensor

ASCII
W00W03W04Wc0Wa8W01WdcW0fWa1

HEX
00 03 04 c0 a8 01 DC 0F A1

Address
192,168,1,199
Port
80
Resend Delay
0
TCP
Send
Save

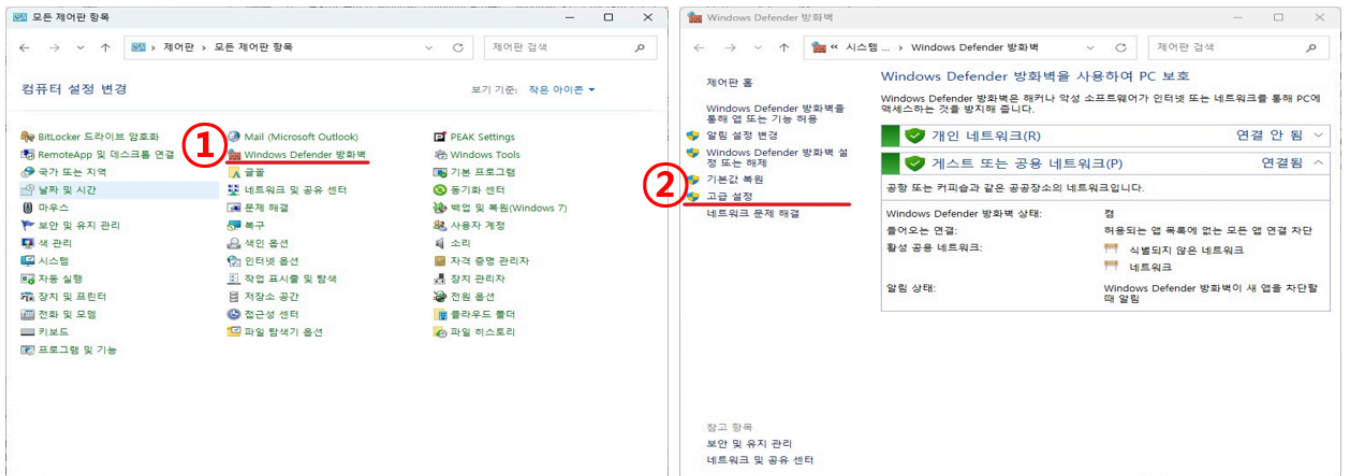
6. Revisions 25.1

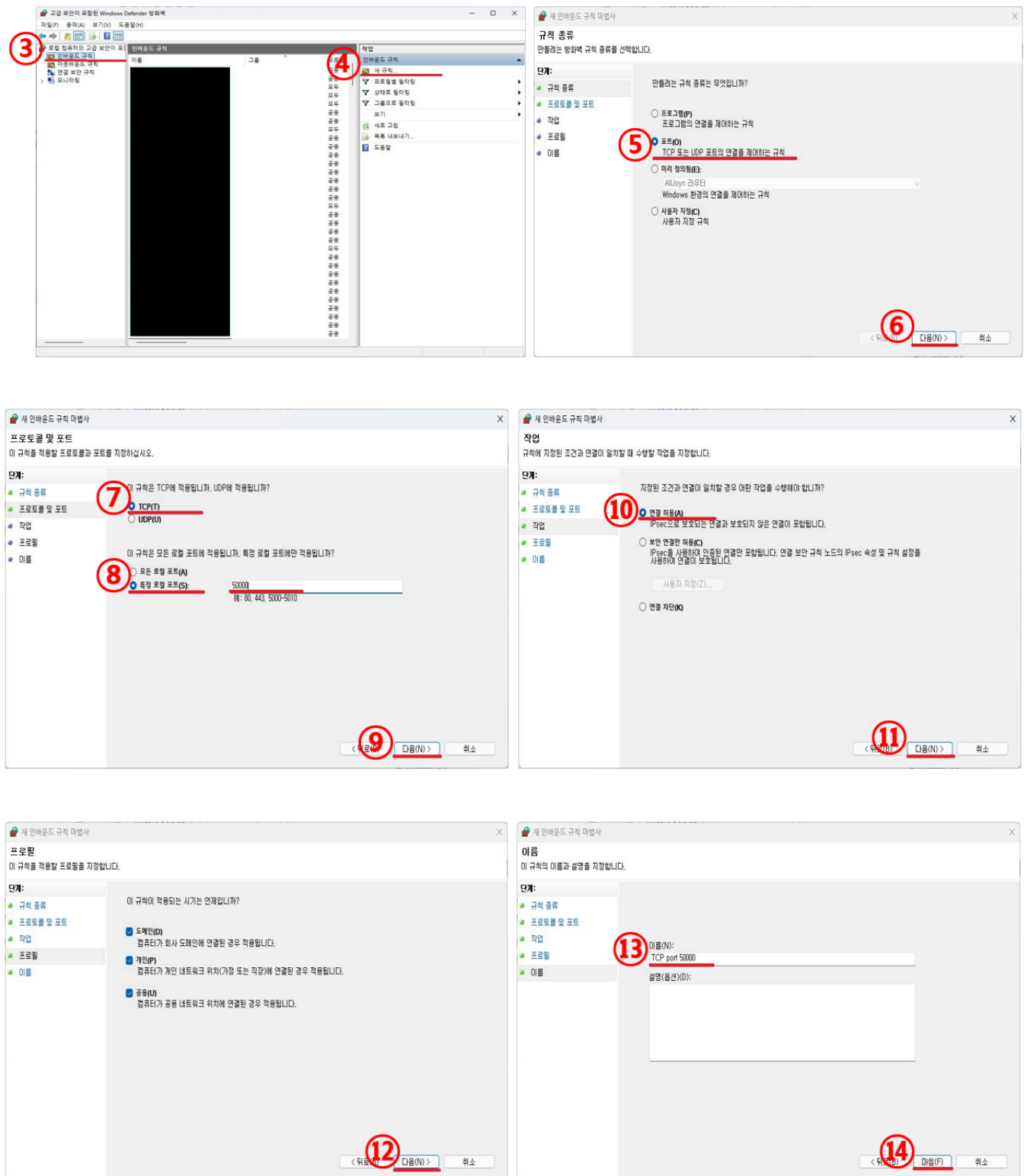


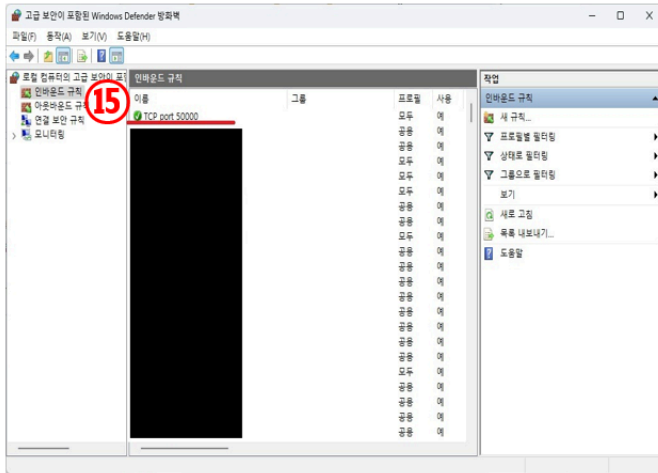
****Sensors produced after September 9, 2025,(S/N: SSAG25R105~),**will have the following changes applied:**

The sensor-side **TCP port** has been changed from **80 to 50000**. The sensor-side **UDP port** has been changed from **8890 to 50000**.

1. **Configuring the firewall to allow port 50000** Accordingly, on some PCs, it may be necessary to configure firewall settings to open the new port as shown below.







1. TCP or UDP communication Except for the change to port number 50000, the command descriptions remain the same as before.

ASCII	\00\03\02				Load File
HEX	00 03 02				
Address	192.168.1.199	Port	50000	Resend Delay	0
			UDP	Send	Save
ASCII	\00\03\03				Load File
HEX	00 03 03				
Address	192.168.1.199	Port	50000	Resend Delay	0
			UDP	Send	Save
ASCII	\00\03\04				Load File
HEX	00 03 04				
Address	192.168.1.199	Port	50000	Resend Delay	0
			UDP	Send	Save
ASCII	\00\03\02				Load File
HEX	00 03 02				
Address	192.168.1.199	Port	50000	Resend Delay	0
			TCP	Send	Save
ASCII	\00\03\03				Load File
HEX	00 03 03				
Address	192.168.1.199	Port	50000	Resend Delay	0
			TCP	Send	Save
ASCII	\00\03\04				Load File
HEX	00 03 04				
Address	192.168.1.199	Port	50000	Resend Delay	0
			TCP	Send	Save

1. **SET sampling frequency and LPF cut-off frequency** The configurable sampling frequency range is **20 Hz to 1000 Hz** The configurable cutoff frequency must satisfy **1 < freq_cutoff < 500**

AIDIN ROBOTICS

Welcome

Sensor Data

Parameter Setting

Real-time Monitoring

System Setting

AFT SERIES

SMART 6-Axis Force Torque Sensor

System status: healthy
Sensor temperature: 10.4
CONNECT

Sampling frequency setting

Sampling rate

100

Freq (Hz)

WRITE SETTING

Frequency Response

☒ Fx ☒ Fy ☒ Fz



Fx

Fy

Fz

Filter Settings

Generated values

Cut-off frequency

100

Freq (Hz)

WRITE SETTINGS

Q & A

(내용 준비 중)

Revision History

Date	Description
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2026.09.15	Initial release (Current version)
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