

Introduction Manual
of
ForceSensorController Evaluation Kit

Rev.6

2021.07.30

MITSUMI ELECTRIC CO.,LTD.
Semiconductor Business Div.

■ Evaluation Kit

This Evaluation Kit consists of below:

- ✓ Force/Torque Sensor sample



- ✓ Cable for sensor connection

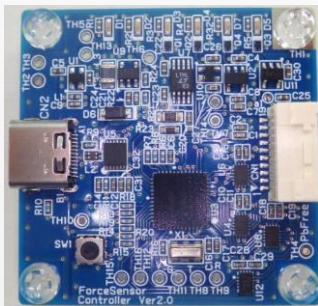


- ✓ Conversion Board
Conv.BD Ver1.0

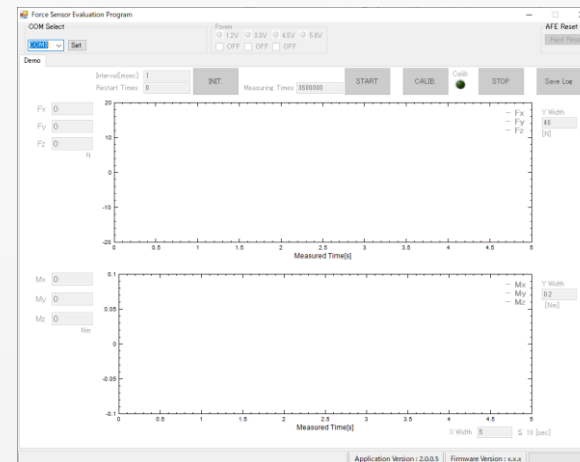


- ✓ USB TypeC cable

- ✓ Evaluation Board
ForceSensorControllerBoard Ver2.0
MCU FW 2.0.0.x



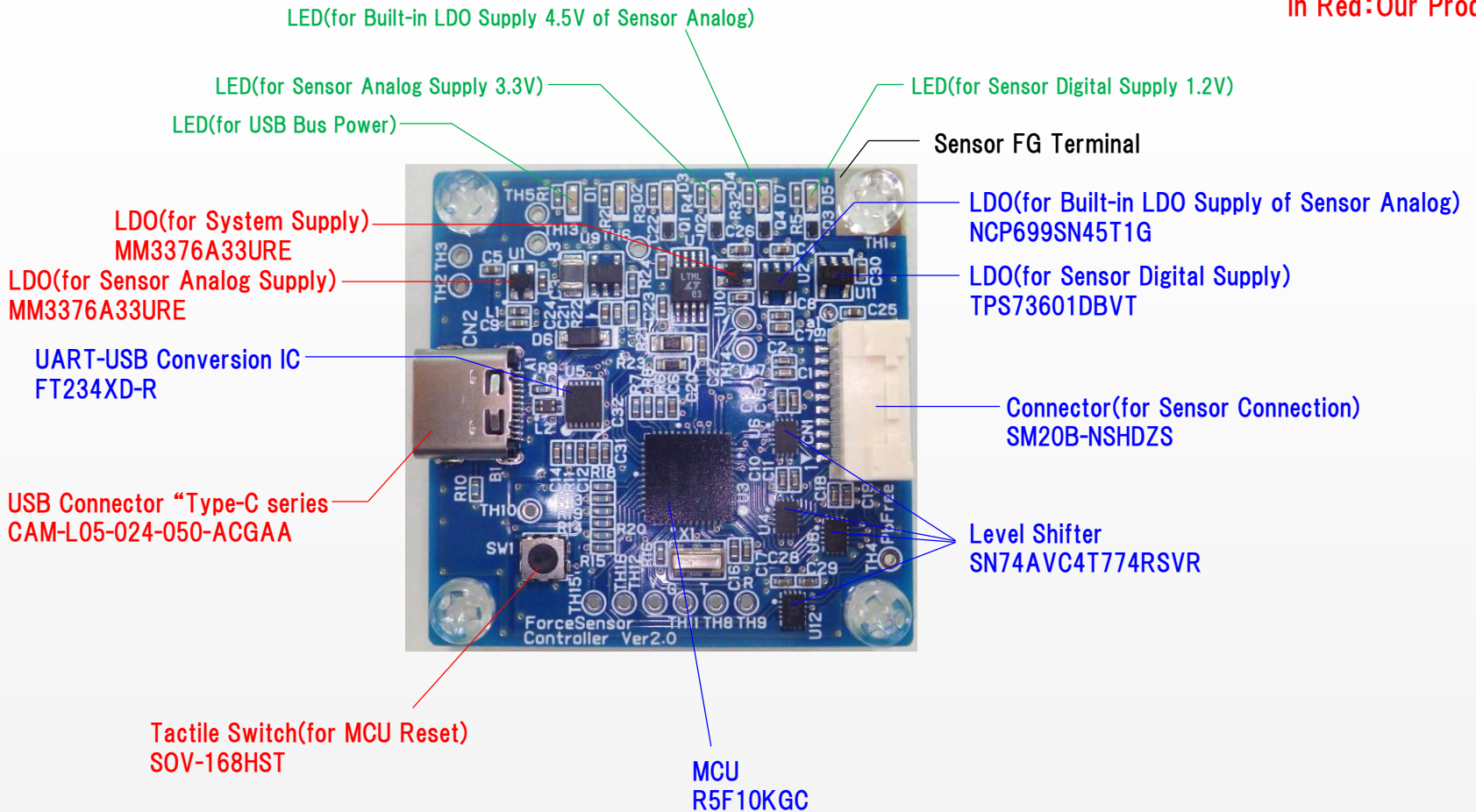
- ✓ Evaluation App. ForceSensorEvaluationProgram
App Ver. 2.0.0.5



■ Evaluation Board

ForceSensorController Ver2.0
Board Size: 40x40mm

In Red: Our Products



■ Setup (Install driver)

This evaluation board operate a UART-USB conversion of FTDI's IC. To download or update the driver, please follow the steps below.

1. Download the latest driver file from the FTDI website. Please select the driver to your operating system.

FTDI drivers download website: <https://www.ftdichip.com/Drivers/VCP.htm>

VCP Drivers

Virtual COM port (VCP) drivers cause the USB device to appear as an additional COM port available to the PC. Application software can access the USB device in the same way as it would access a standard COM port.

This software is provided by Future Technology Devices International Limited "as is" and any express or implied warranties, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose are disclaimed. In no event shall future technology devices international limited be liable for any direct, indirect, incidental, special, exemplary, or consequential damages (including, but not limited to, procurement of substitute goods or services, loss of use, data, or profits, or business interruption) however caused and on any theory of liability, whether in contract, strict liability, or tort (including negligence or otherwise) arising in any way out of the use of this software, even if advised of the possibility of such damage.

FTDI drivers may be used only in conjunction with products based on FTDI parts.


FTDI drivers may be distributed in any form as long as license information is not modified.

If a custom vendor ID and/or product ID or description string are used, it is the responsibility of the product manufacturer to maintain any changes and subsequent WHCK re-certification as a result of making these changes.

For more detail on FTDI Chip Driver licence terms, please [click here](#).

Currently Supported VCP Drivers:

Subscribe to Our Driver Updates



Operating System	Release Date	Processor Architecture								Comments
		X86 (32-Bit)	X64 (64-Bit)	PPC	ARM	MIPSII	MIPSIV	SH4		
Windows*	2021-06-17	2.12.36.2	2.12.36.2	-	-	-	-	-	-	WHQL Certified. Includes VCP and D2XX. Available as a setup executable . Please read the Release Notes and Installation Guides .
Linux	-	-	-	-	-	-	-	-	-	All FTDI devices now supported in Ubuntu 11.10, kernel 3.0.0-19. Refer to TIN-101 if you need a custom VCP VID/PID in Linux. VCP drivers are integrated into the kernel .
Mac OS X 10.3 to 10.8	2012-08-10	2.2.18	2.2.18	2.2.18	-	-	-	-	-	Refer to TIN-105 if you need a custom VCP VID/PID in MAC OS
Mac OS X 10.9 to 10.14	2019-12-24	-	2.4.4	-	-	-	-	-	-	This driver is signed by Apple
Mac OS X10.15 and macOS 11	2021-06-18	-	1.4.7	-	-	-	-	-	-	This is a Beta driver release and the installer should be run from the Applications folder on your machine
Windows CE 4.2-5.2**	2012-01-06	1.1.0.20	-	-	1.1.0.20	1.1.0.10	1.1.0.10	1.1.0.10	1.1.0.10	
Windows CE 6.0/7.0	2016-11-03	1.1.0.22 CE 6.0 CAT CE 7.0 CAT	-	-	1.1.0.22	1.1.0.10	1.1.0.10	1.1.0.10	1.1.0.10	For use of the CAT files supplied for ARM and x86 builds refer to AN-219
Windows CE 2013	2015-03-06	1.0.0	-	-	1.0.0	-	-	-	-	VCP Driver Support for WinCE2013

*Includes the following version of the Windows operating system: Windows 7, Windows Server 2008 R2 and Windows 8, 8.1, Windows server 2012 R2, Windows Server 2016 and Windows 10. Also, as Windows 8 RT is a closed system not allowing for 3rd party driver installation our Windows 8 driver will not support this variant of the OS. You must use the Windows RT build for this platform.

**Includes the following versions of Windows CE 4.2-5.2 based operating systems: Windows Mobile 2003, Windows Mobile 2003 SE, Windows Mobile 5, Windows Mobile 6, Windows Mobile 6.1, Windows Mobile 6.5

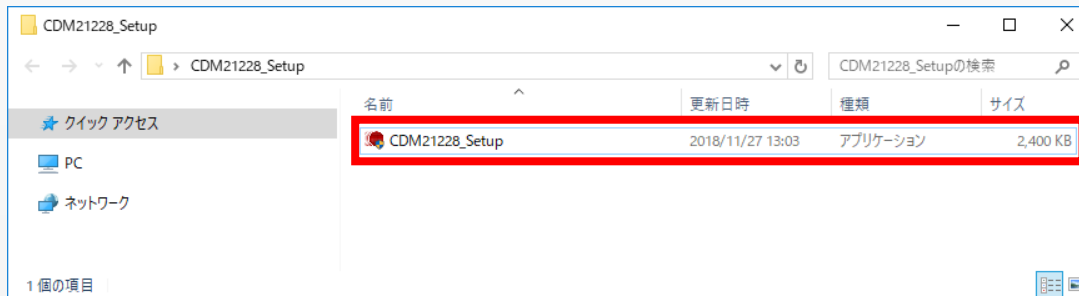
No Longer Supported:

e.g. : For Windows

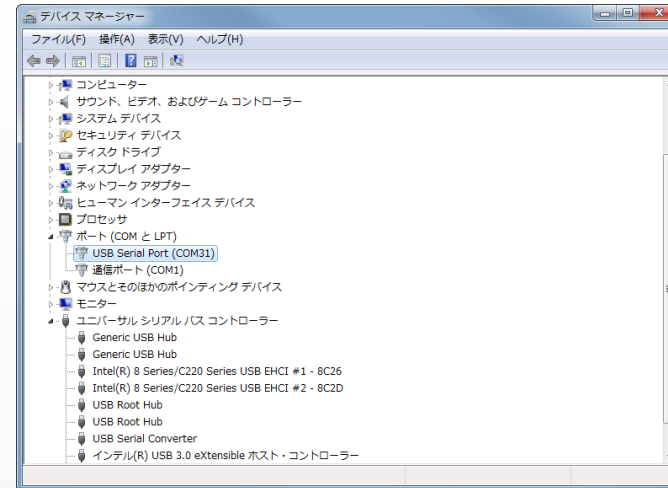
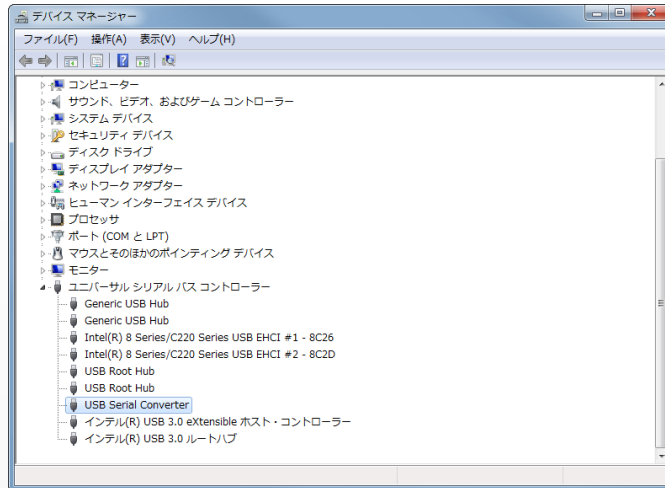
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Linux	-	-	-	-	-	-	-	-	-	All FTDI devices now supported in Ubuntu 11.10, kernel 3.0.0-19 Refer to TN-101 if you need a custom VCP VID/PID in Linux VCP drivers are integrated into the kernel .
Mac OS X 10.3 to 10.8	2012-08-10	2.2.18	2.2.18	2.2.18	-	-	-	-	-	Refer to TN-105 if you need a custom VCP VID/PID in MacOS.
Mac OS X 10.9 to 10.14	2019-12-24	-	2.4.4	-	-	-	-	-	-	This driver is signed by Apple.
Mac OS X10.15 and macOS 11	2021-05-18	-	1.4.7	-	-	-	-	-	-	This is a Beta driver release and the installer should be run from the Downloads folder on your machine.
Windows CE 4.2-5.2**	2012-01-06	1.1.0.20	-	-	1.1.0.20	1.1.0.10	1.1.0.10	1.1.0.10	1.1.0.10	
Windows CE 6.0/7.0	2016-11-03	1.1.0.22 CE 6.0 CAT CE 7.0 CAT	-	-	1.1.0.22 CE 6.0 CAT CE 7.0 CAT	1.1.0.10	1.1.0.10	1.1.0.10	1.1.0.10	For use of the CAT files supplied for ARM and x86 builds refer to AN-319
Windows CE 2013	2015-03-06	1.0.0	-	-	1.0.0	-	-	-	-	VCP Driver Support for WinCE2013

Click “setup executable” and download the setup file

The following file will be downloaded.
Click “CDM21228_Setup”, and install according to the displayed information.



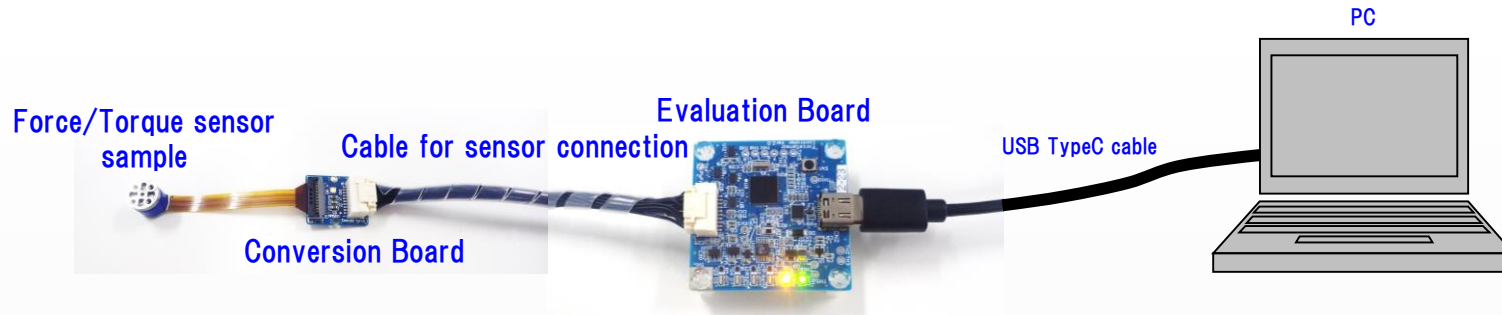
2. After the installation is completed, confirm that “USB Serial Converter” and “USB Serial Port (COMx)” are displayed in the device manager with the evaluation board connected.
*When connecting for the first time, recognition may take some time.



3. USB Serial Port (COMx) is required for communication settings. Check the assigned port number.
*The port number assignment differs depending on the PC.

■ Setup Evaluation Kit (Hardware)

Connect the evaluation kit as shown below.



After the connection of the evaluation kit is completed, start “ForceSensor_EvaluationProgram.exe” in the “ForceSensor_EvaluationProgram_ver.2.0.0.5” zip file.

*To operate this application, .NET Framework 3.5 must be valid. The activation procedure is posted on the Microsoft website (the following URL). If it is not activated, activate it according to the contents of the website.

Microsoft .NET Framework 3.5 activation procedure homepage URL:

https://blogs.technet.microsoft.com/askcorejp/2018/10/05/enable_net35_win10/

■ Evaluation app. display screen

Data acquisition interval setting
 *The setting is 1-10000msec (1msec step)

Initiation button
 *Read matrix correction coefficient from the AFE IC inside the sensor. Then the sensor operation is started. The button turns light green while sensor is operating.

Power switch
 1.2V: Sensor digital power supply
 3.3V: Sensor analog power supply
 4.5V: Power supply for sensor built-in LDO (sensor analog power supply)

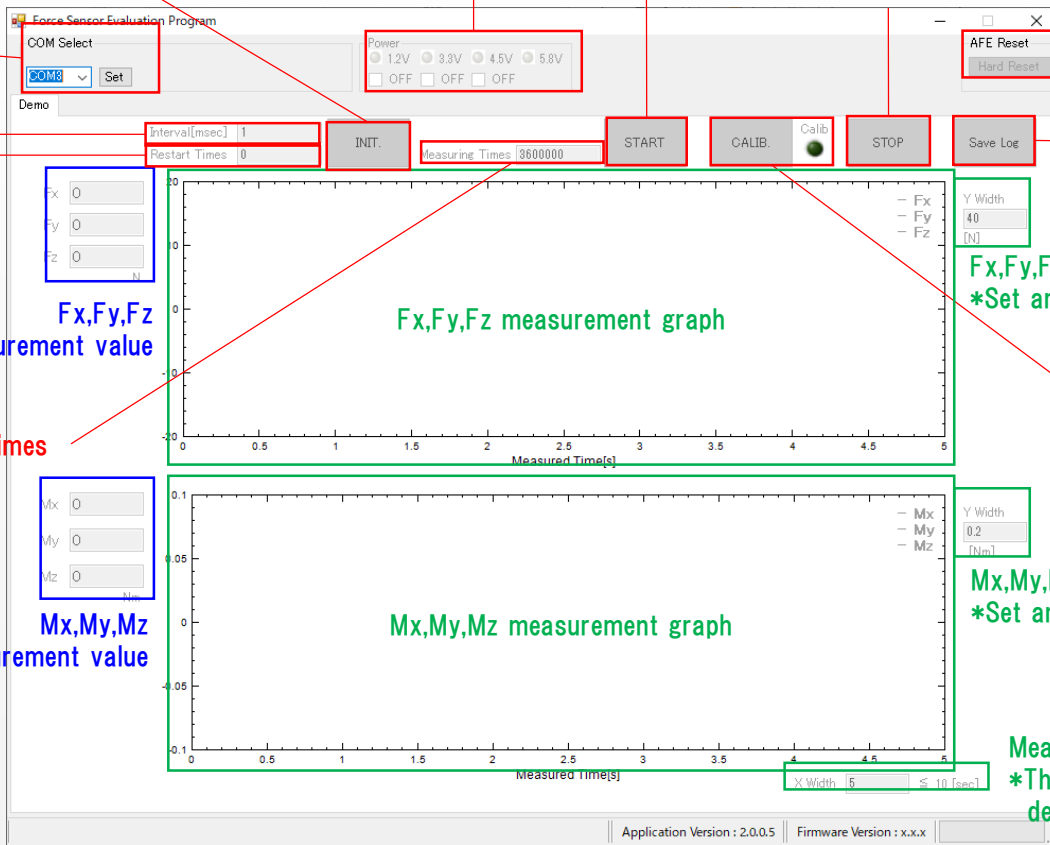
Logging start button

Logging stop button

AFE IC (inside sensor) reset button

Data save button
 *Continuous measurement data is output as a CSV file,
 *For details to P.12

COM selection



Offset temperature correction update setting
 *Offset temperature correction is performed for each set number of data acquisitions.

Fx,Fy,Fz measurement value

Number of measurement times

Mx,My,Mz measurement value

Fx,Fy,Fz measurement graph Y-axis scale setting
 *Set around 0 N

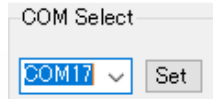
Calibration button
 *While the calibration is valid, the lamp on the right side of the button lights up.
 *For details to P.11

Mx,My,Mz measurement graph Y-axis scale setting
 *Set around 0 Nm

Measurement graph X-axis scale setting
 *The maximum value that can be set changes depending value of interval

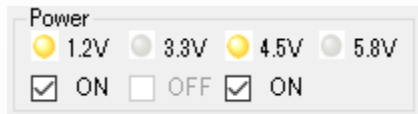
■ How to use the evaluation application software

1. Select the COM port on the evaluation board. Click the “Set” button.



*The COM port depends on the PC. Please refer to P.6 for confirmation.

2. Put “✓” in the 1.2V and 4.5V check boxes of Power.

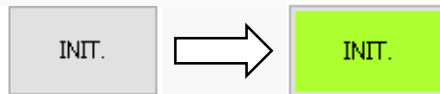


3. Enter Interval and Restart times.

Interval[msec]	1
Restart Times	0

*Offset temperature correction is performed for each set number of data acquisitions
When not performing offset temperature correction, enter “0” for the value of Restart Times.
If it is 1 or more, offset temperature correction is performed every time the set numerical data is acquired.

4. Click the “INIT.” button.



*The sensor operation is started.
The “INIT.” button turns light green while the sensor is operating.
Click it again to stop the sensor operation.

5. Enter Measuring Times.

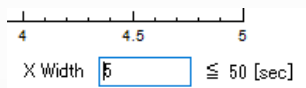
Measuring Times	3600000
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■ How to use the evaluation application software

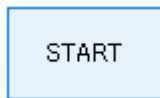
6. Enter Y Width (Value can be changed even during measurement)



7. Enter X Width (Value can be changed even during measurement)

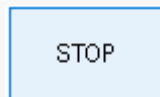


8. Click START button => The data logging starts

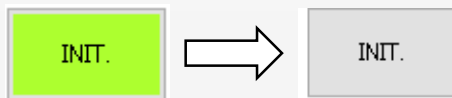


9. Click STOP button => The data logging stops

If the data of Measuring Times set before measurement is acquired, measurement will stop without clicking the “STOP” button.



10. Click “INIT.” button => The sensor operation stops.



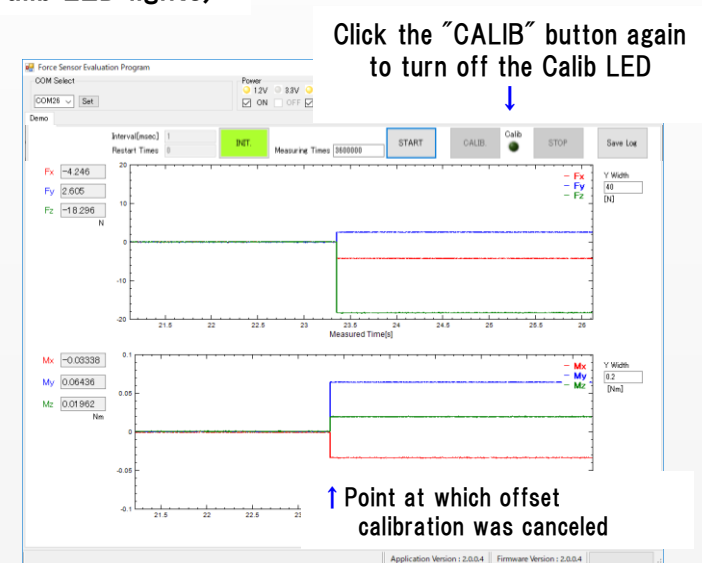
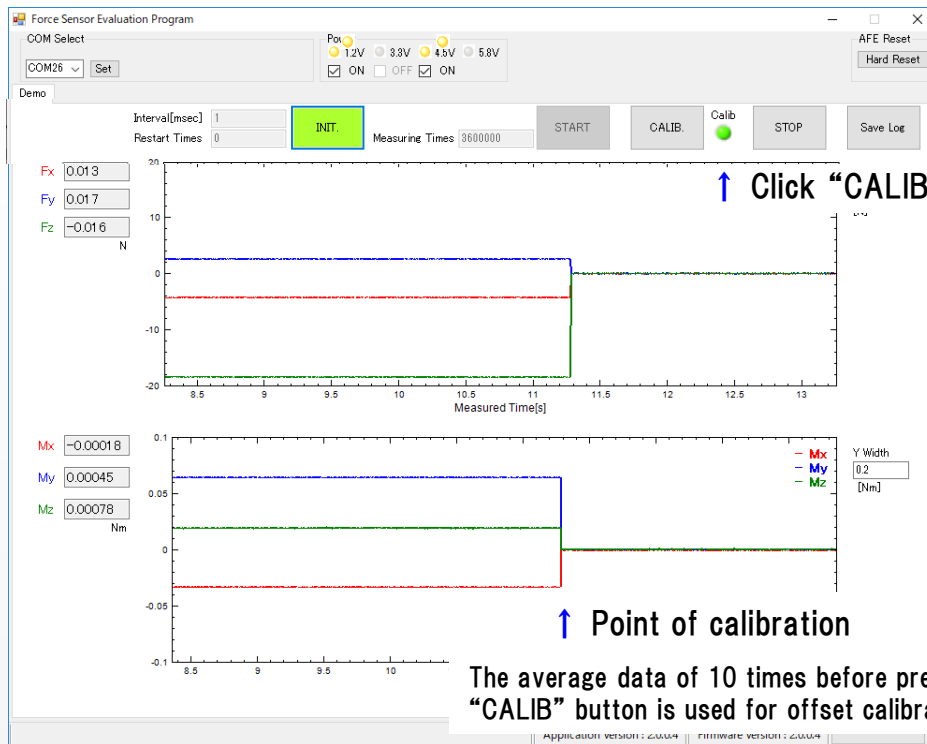
*The sensor operation is stopped.
The “INIT.” button turns gray after the sensor operation stops

Note:

When swapping samples while the app. is running, please stop the sensor operation and uncheck the 1.2V and 4.5V power. After the replacement, put a check mark in the 1.2V and 4.5V check boxes of Power again, and start from Step 3.

■ Evaluation application software “Function of offset calibration”

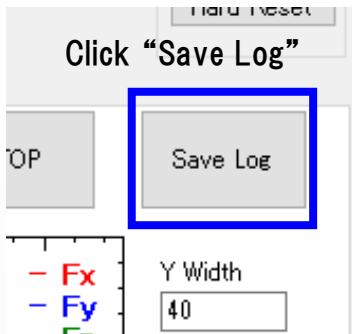
The sensor output has an initial offset. Offsets also occur due to mounting and gravity. It is possible to calibrate the offset deviation with the “CALIB.” Button. Press the “CALIB.” Button again to cancel offset calibration.



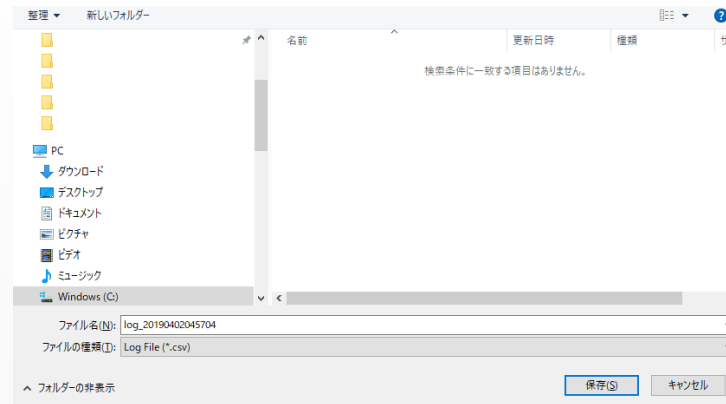
Perform offset correction at least 3 minutes after the sensor operation START.
***Output fluctuation (initial drift) occurs for about 5 minutes after sensor startup.**
Start using after a warm-up time of at least 5 minutes.

■ Evaluation application software “Data save”

The data acquired by measurement can be saved with the “Save Log” button.



The following window will be displayed. Enter the file name and click the “Save” button.



The data will be saved in the following format.

	A	B	C	D	E	F	G	H	I
1	2019/4/3 14:20								
2	count[times]	Measured Time[s]	Fx Value[N]	Fy Value[N]	Fz Value[N]	Mx Value[Nm]	My Value[Nm]	Mz Value[Nm]	Temp.Value[degC]
3	1	0.00244	0.014	-0.095	-1.537	0.00085	-0.0007	-0.00027	0
4	2	0.003681	0.013	-0.12	-1.318	0.00121	-0.00062	-0.00087	0
5	3	0.004922	0.009	-0.125	-1.214	0.00113	-0.00081	-0.00121	0
6	4	0.006161	-0.011	-0.106	-1.052	0.00119	-0.00085	-0.00088	0
7	5	0.0074	0.003	-0.111	-0.961	0.00093	-0.00067	-0.00131	0
8	6	0.008641	0.005	-0.133	-0.837	0.0012	-0.00091	-0.00124	0
9	7	0.009882	0.003	-0.099	-0.743	0.0009	-0.00081	-7.00E-05	0