

『MMS101 Evakit1』 User's Guide:

Instruction Manual

OUTLINE

This document is the instruction manual of "MMS101 Evakit1".

This kit can acquire MMS101 logging data with PC and USB communication.

Refer to the datasheet for more information on MMS101.

CAUTION

This kit is an evaluation / sales promotion tool specifically for our products.

Therefore, we do not provide any guarantees for the performance, reliability, management of contained substances, export management, and others regarding this kit.

Please let us know that we will replace it if it is defective in its initial state.

This kit is sold only in countries and regions other than the 32 countries listed below.

- EU member states (27 countries)
- EFTA member states (4 countries)
- Turkey


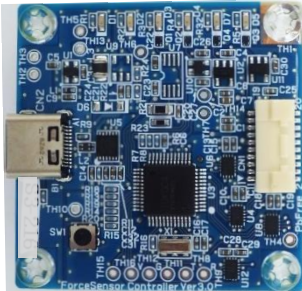

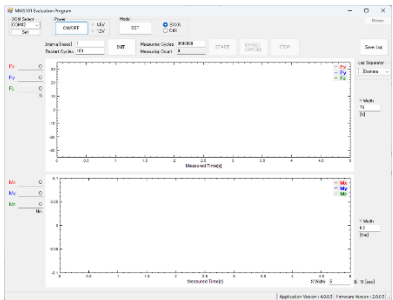

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1 Configuration

1-1 Kit configuration

This evaluation kit consists of below:

Conversion Board	Evaluation Board	Lead / Robot Cable	Evaluation App.
<div><p>MMS101B Conv.BD Ver.1.1</p></div>	<div><p>ForceSensorControllerBoard Ver.3.0 (MCU FW Ver.2.0.0.x)</p></div>	<div><p>Lead Cable 30cm</p></div>	<div><p>ForceSensorEvaluationProgram Ver.4.0.0.3</p></div>
<div><p>MMS101C Conv.BD Ver1.0 + FPC Cable (Molex 15032-0215(*1))</p></div>			

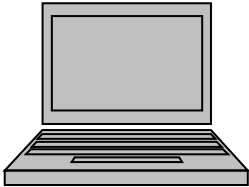
(*1) The equivalent product is the Molex FPC cable (Model No. 15032-0215).
If you need additional purchases or different lengths, please use commercially available FPC cable.

Force Sensor Sample
<div><p>MMS101BXA</p></div>
<div><p>MMS101C09</p></div>

You can choose whether or not to include the force sensor sample by configuring your purchase set.
For details, please refer to "[Ordering information](#)".

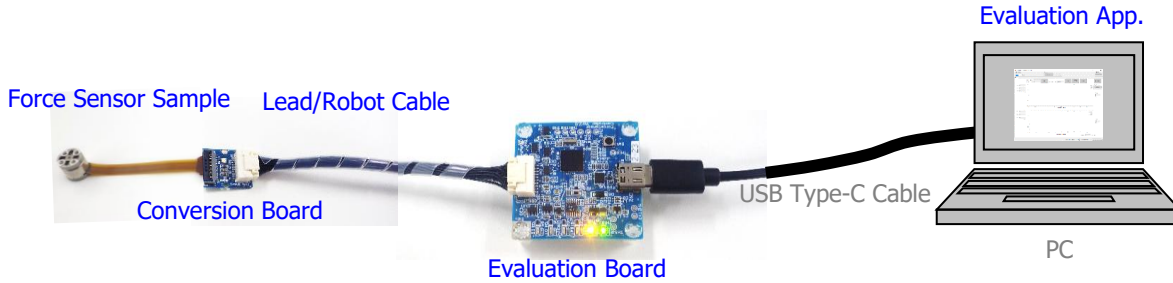
*Please use a conversion board that is compatible with each model.

This evaluation kit does not include the following items. Please prepare them yourself.

USB Type-C Cable	PC
<div>Required Spec. USB cable: USB ver.2.0/Type-C</div>	<div></div>

2 Usage form

Connect the evaluation kit as shown below.



This evaluation board uses FTDI's IC to perform UART-USB conversion, and you may be required to install a driver when connecting for the first time. If the driver does not install automatically, download the appropriate file for your environment from the FTDI website and install it.

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

3 Evaluation application

3-1 File configuration

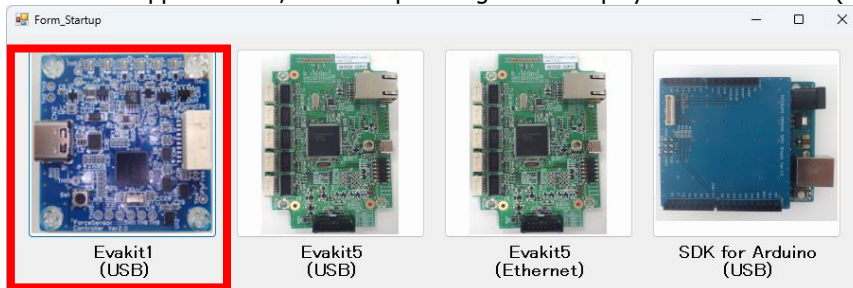
The file configuration of the evaluation application is as follows.

```
[ForceSensor_EvaluationProgram_ver.4.0.0.5]
├ ForceSensor_EvaluationProgram.exe: Application
├ NPlot.dll: Library for drawing graphs
├ OpenTK.dll: Library for drawing graphs
├ OpenTK.GLControl.dll: Library for drawing graphs
├ [Settings]: Settings storage folder
├ [UserData]: Data storage folder
```

3-2 How to use the evaluation application

3-2-1 Launch the evaluation application

When the app is started, a "Start up" dialog will be displayed. Click "Evakit1 (USB)".



This app has been confirmed to work on Windows 11.

This app requires .NET Framework 4.8. An installation guide is available on the Microsoft website (URL below), so please install it according to your environment.

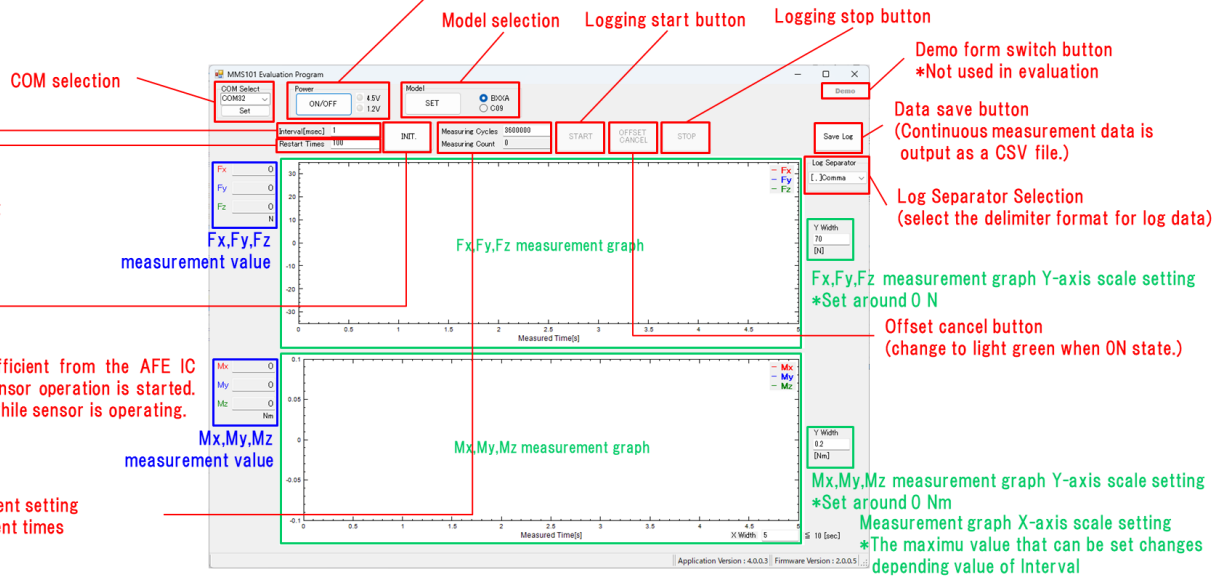
Microsoft .NET Framework 4.8 install guide homepage URL:

<https://learn.microsoft.com/ja-jp/dotnet/framework/install/>

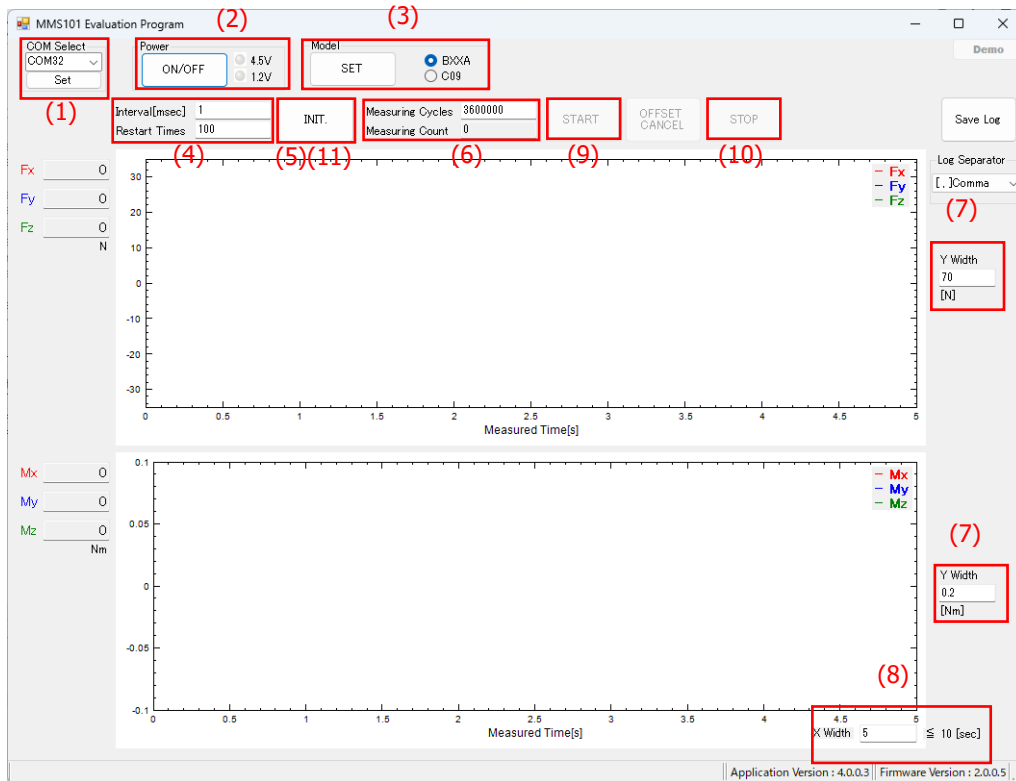
3-2-2 Display screen

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

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



3-2-3 Basic instruction for use



- (1) Select the COM port on the evaluation board. Click the “Set” button.
The COM port depends on the PC.
- (2) Click the “ON/OFF” key on Power. => Turn on LED of 4.5V, 1.2V.
- (3) Select the mode and click the “SET” button.
- (4) Enter Interval[msec] and Restart times.
The temperature sensor value for offset/temperature control is updated every number of times the numerical value set in Restart Times is acquired.
e.g. Restart Times=0 : Temperature sensor value acquisition is the first time only. No temperature value updating is performed thereafter.
Restart Times=1 : Update temperature sensor value every time
Restart Times=10 : Temperature sensor value updated once every 10 data acquisitions
- (5) 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.
- (6) Enter Measuring Cycles.
The settable number of measurements is 2,147,483,647 at the maximum.
Since the number of measurements depend on the PC specification, it should be set so that "the number of measurements x 64 bytes" is less than "available PC memory".
- (7) Enter Y Width. (Value can be changed even during measurement)
- (8) Enter X Width. (Value can be changed even during measurement)
- (9) Click the “START” button. => The data logging starts.
- (10) Click the “STOP” button. => The data logging stops.
If the data of Measuring Cycles set before measurement is acquired, measurement will stop without clicking the “STOP” button.
- (11) Click the “INIT.” button => The sensor operation stops.
The sensor operation is stopped.
The “INIT.” button turns gray after the sensor operation stops.

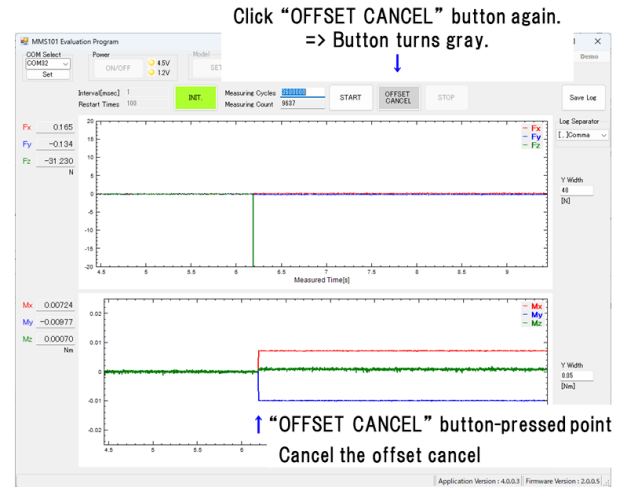
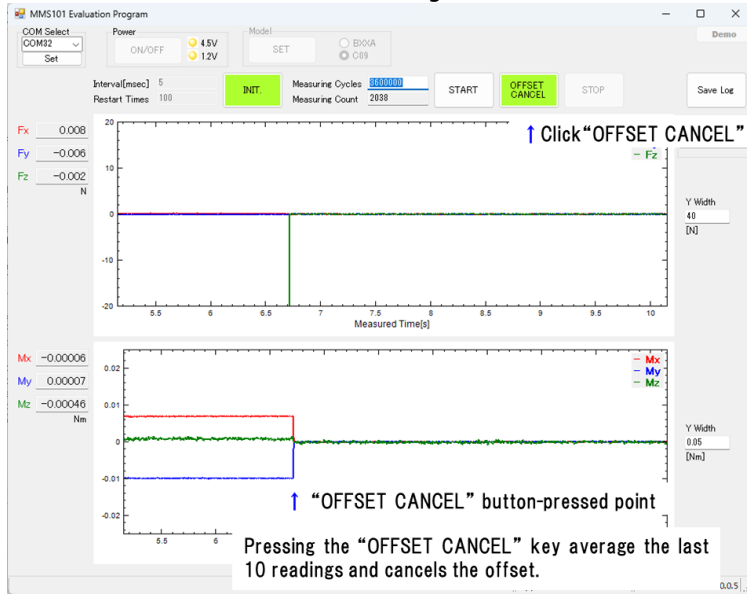
Before replacing the sample while the application is running, stop the sensor operation and press the "ON/OFF" key on Power to drop 4.5V, 1.2V. After replacement, press the "ON/OFF" key on Power again to turn on 4.5V, 1.2V LED, and then proceed from step 3 of the basic usage.

3-2-4 Offset cancel procedure

The sensor output has an initial offset. Offset also occurs in the mounted condition or in gravity.

It is possible to cancel the offset deviation with the "OFFSET CANCEL" button.

Click the "OFFSET CANCEL" button again to cancel the offset cancel.

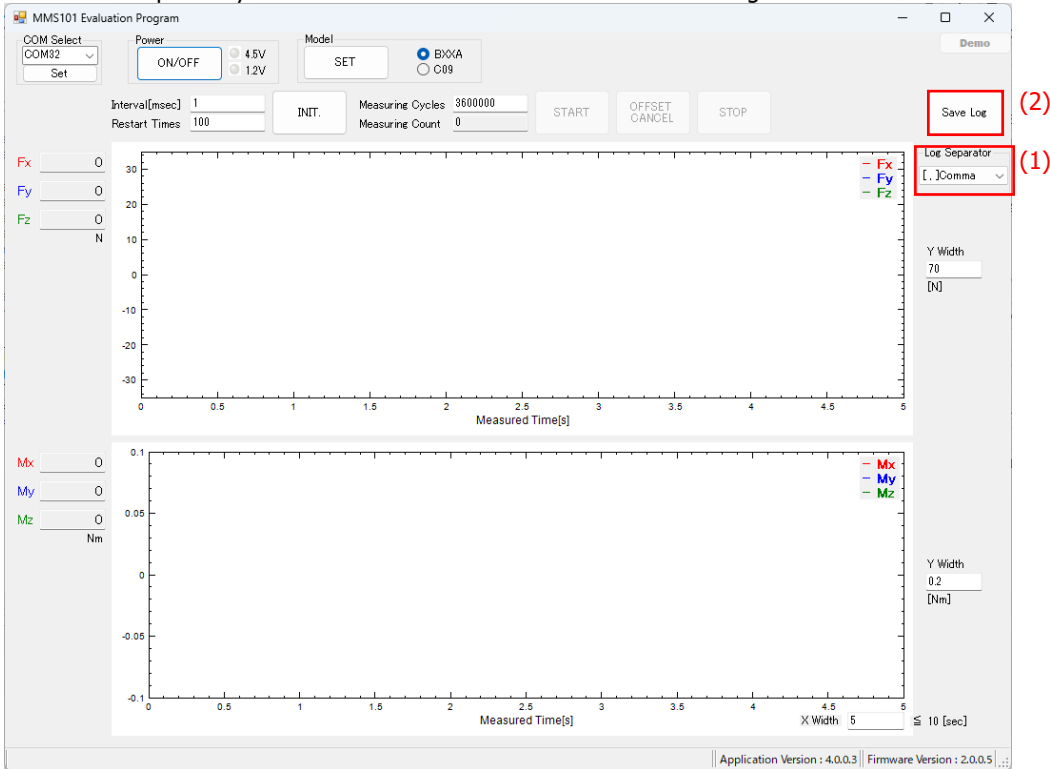


Please click the "OFFSET CANCEL" button after more than 5min has elapsed since sensor operation started to use.

*It is recommended that the output (initial-drift) stabilization wait time after sensor activation be equal to or greater than 5min.

3-2-5 Measurement data saving procedure

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



- (1) Select the log separator.
[,]Comma
[;]Semicolon
[]Tab
- (2) Click the “Save Log” button.
The logs are saved in the “UserData1” folder, located within the Evaluation Application’s folder, using the file name specified below.

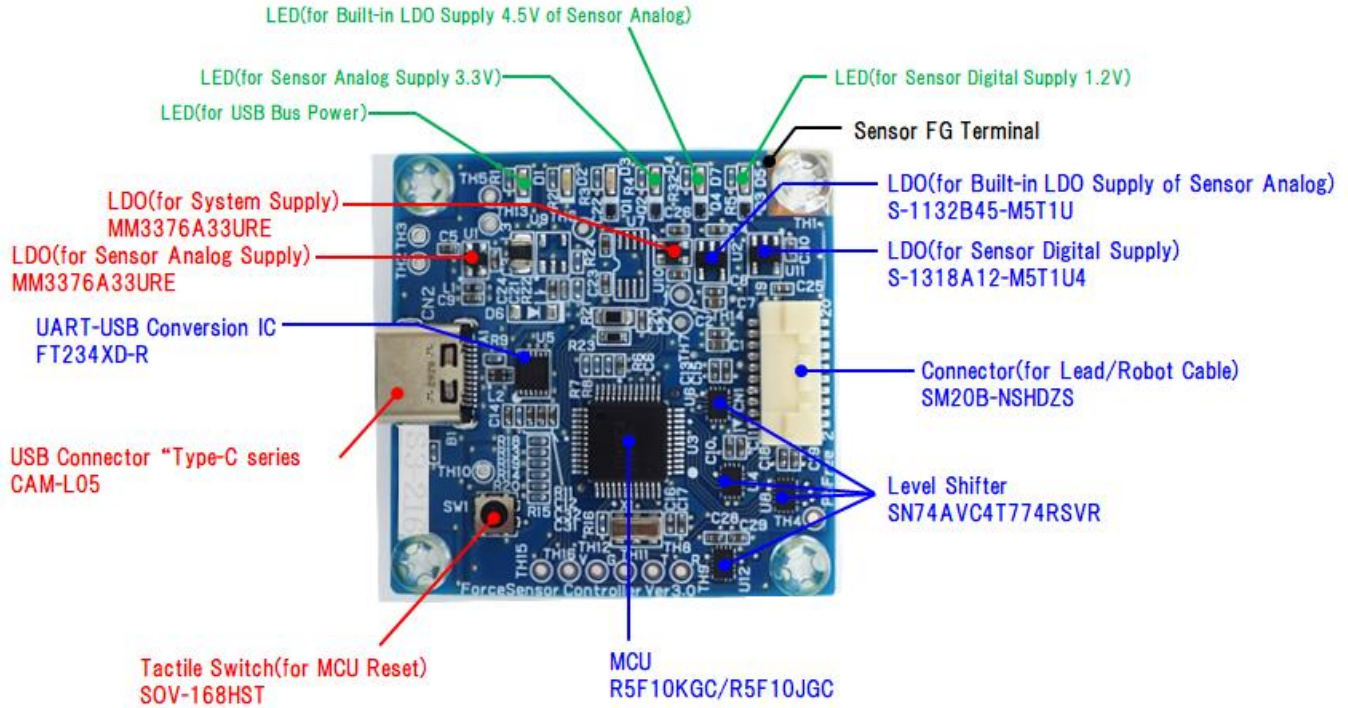
log[yyyyMMddhhmmss].txt
(yyyy:Year / MM:Month / dd:Day / hh:Hour / mm:Minute / ss:Second)

The data will be saved in the following format.

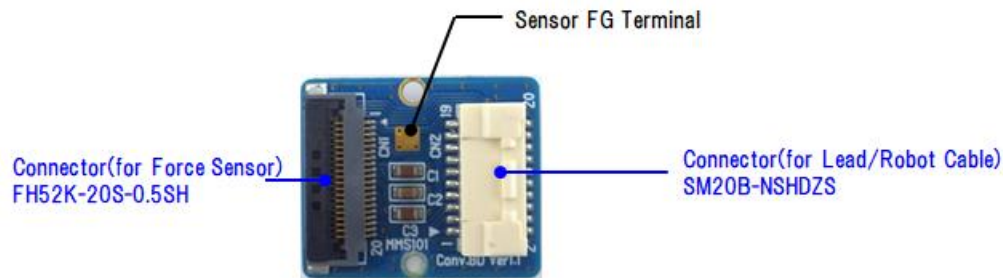
#	A	B	C	D	E	F	G	H
1	2019/4/3 14:20							
2	count(times)	Measured Time[s]	Fx Value[N]	Fy Value[N]	Fz Value[N]	Mx Value[Nm]	My Value[Nm]	Mz Value[Nm]
3	1	0.00244	0.014	-0.095	-1.537	0.00095	-0.0007	-0.00027
4	2	0.003681	0.013	-0.12	-1.318	0.00121	-0.00062	-0.00087
5	3	0.004922	0.009	-0.125	-1.214	0.00113	-0.00081	-0.00121
6	4	0.006161	-0.011	-0.106	-1.052	0.00119	-0.00085	-0.00088
7	5	0.0074	0.003	-0.111	-0.951	0.00093	-0.00067	-0.00131
8	6	0.008641	0.005	-0.133	-0.837	0.0012	-0.00091	-0.00124
9	7	0.009882	0.003	-0.099	-0.743	0.0009	-0.00081	-7.00E-05

4 Board configuration

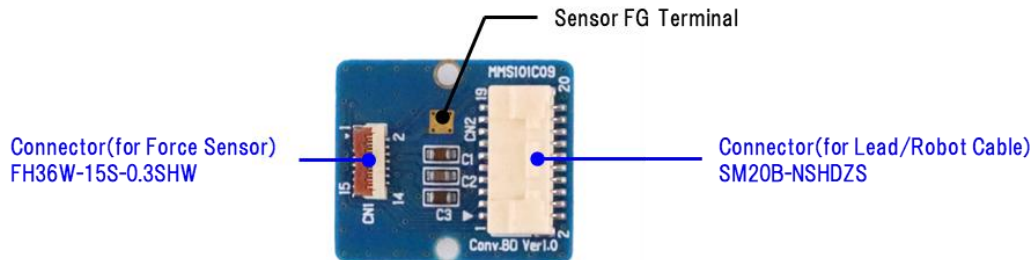
4-1 Evaluation Board: ForceSensorControllerBoard Ver.3.0



4-2 Conversion Board: MMS101B Conv.BD Ver.1.1

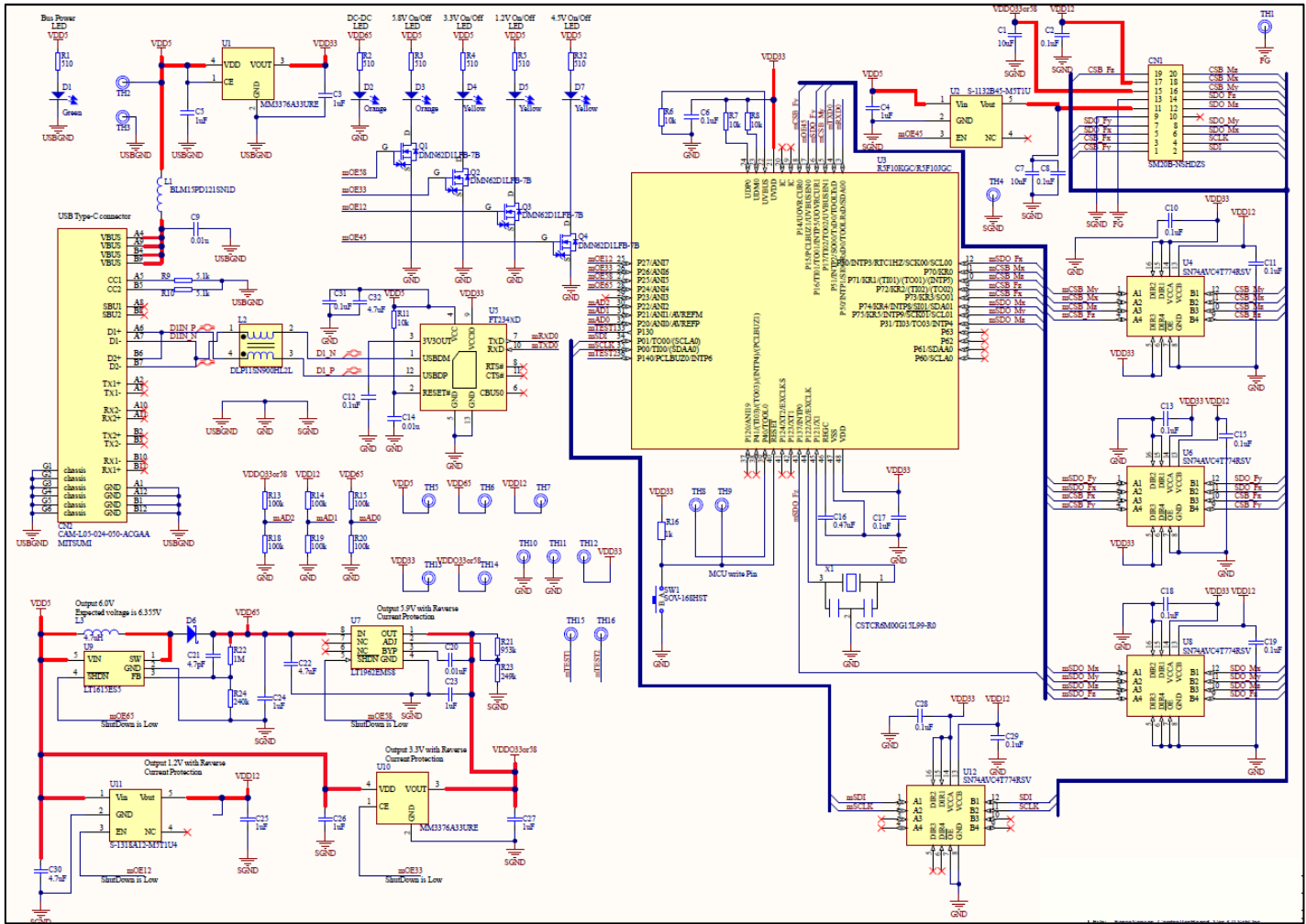


4-3 Conversion Board: MMS101C Conv.BD Ver.1.0

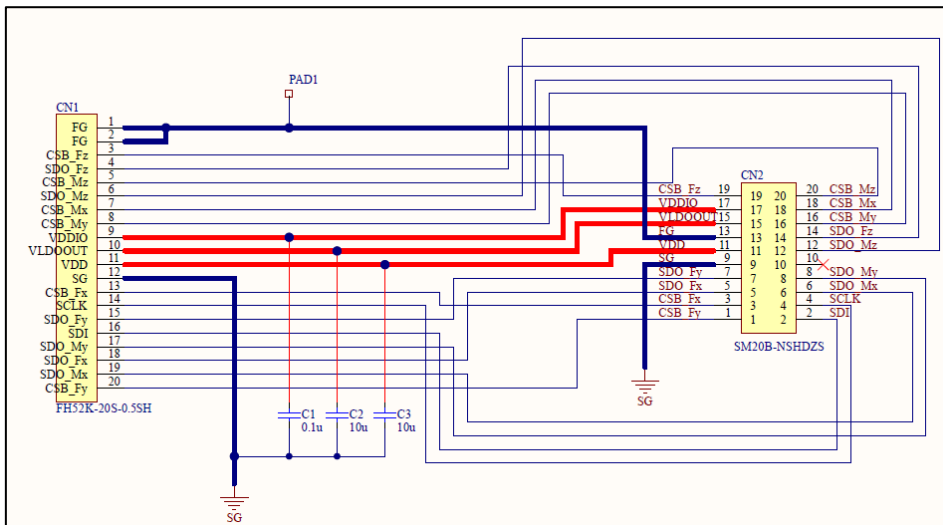


5 Schematic circuit diagram

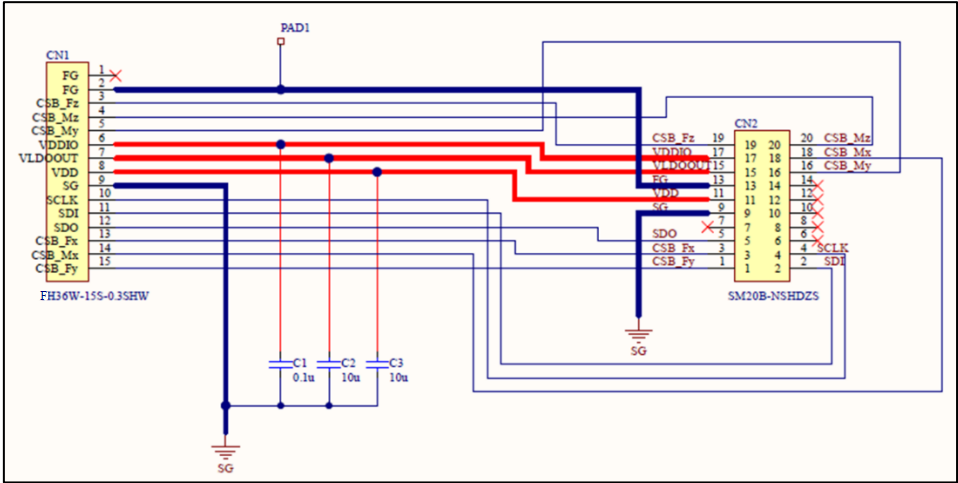
5-1 Evaluation Board: ForceSensorControllerBoard Ver.3.0



5-2 Conversion Board: MMS101B Conv.BD Ver.1.1



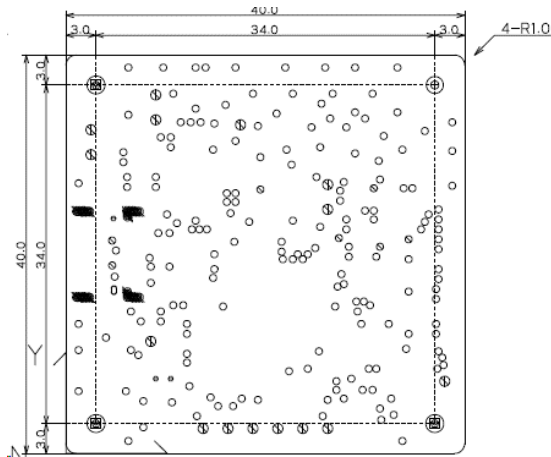
5-3 Conversion Board: MMS101C Conv.BD Ver.1.0



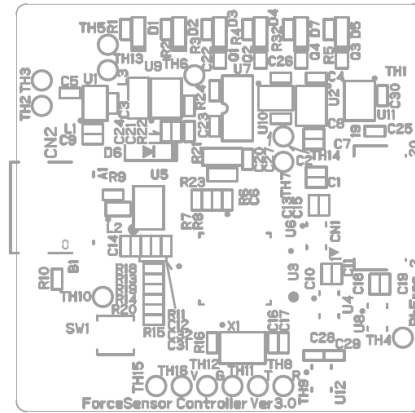
6 Layout diagram

6-1 Evaluation Board: ForceSensorControllerBoard Ver.3.0

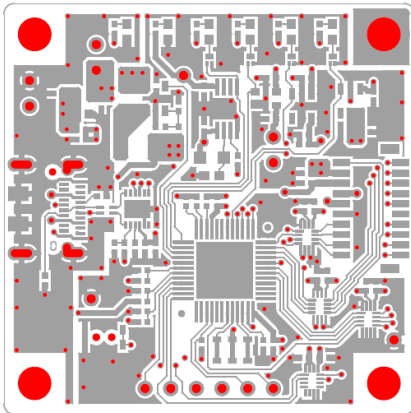
Mounting hole: $\Phi 3.2$



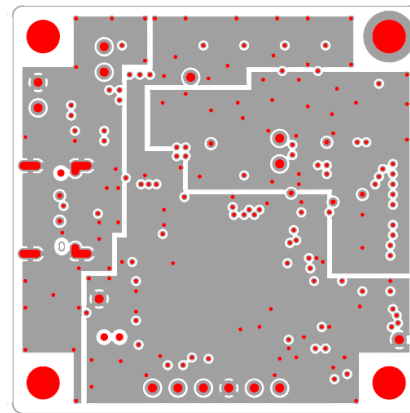
Dimensions (Unit: mm)



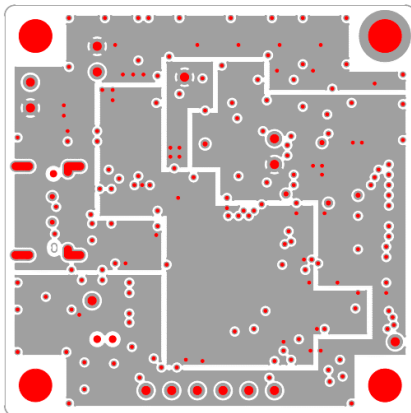
Component placement



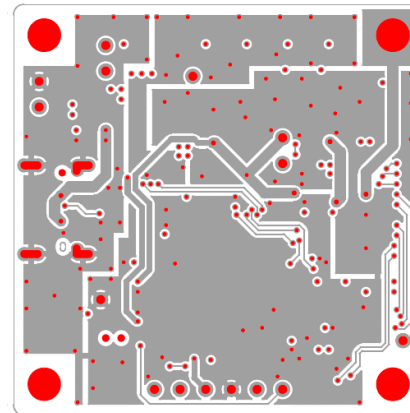
Pattern (Component side)



Pattern (L2)



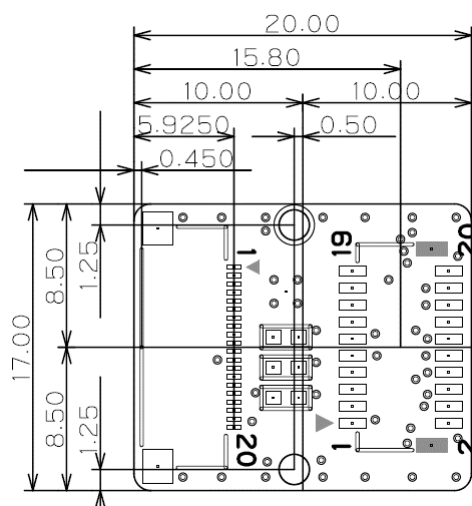
Pattern (L3)



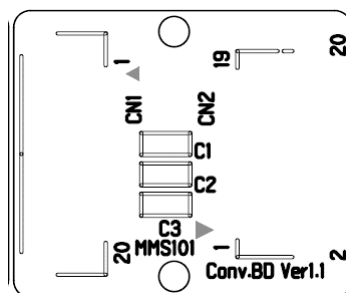
Pattern (Solder side)

6-2 Conversion Board: MMS101B Conv.BD Ver.1.1

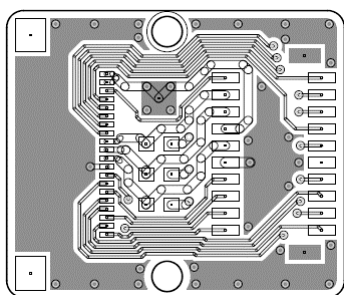
Mounting hole: $\Phi 1.8$



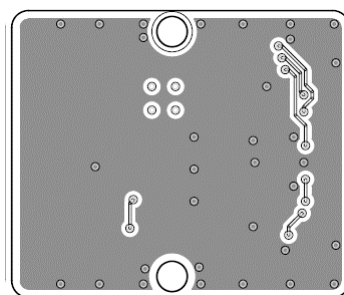
Dimensions (Unit: mm)



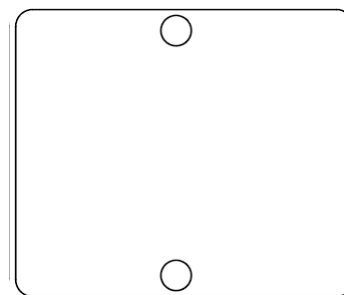
Component placement



Pattern (Component side)



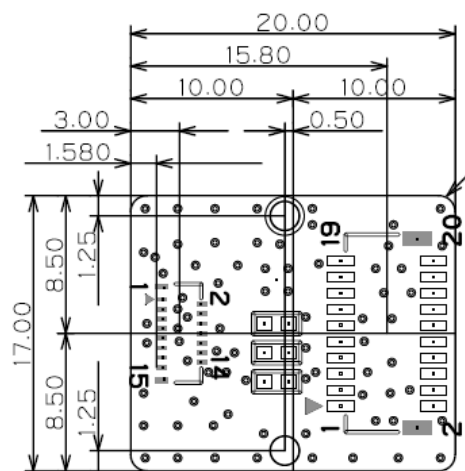
Pattern (L2)



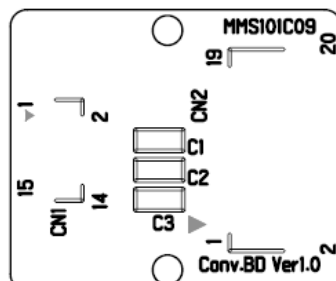
Pattern (Solder side)

6-3 Conversion Board: MMS101C Conv.BD Ver1.0

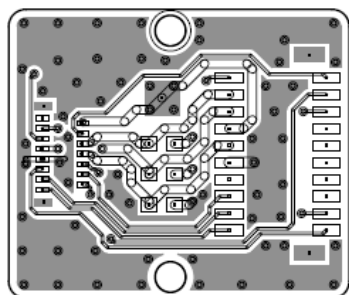
Mounting hole: $\Phi 1.8$



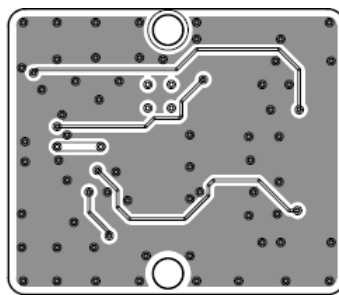
Dimensions (Unit: mm)



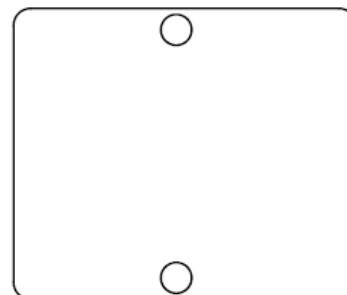
Component placement



Pattern (Component side)



Pattern (L2)



Pattern (Solder side)

7 BOM list

7-1 Evaluation Board: ForceSensorControllerBoard Ver.3.0

Designator	Model	Maker	Parts name	Value	Q'ty
C1, C7	GRM155R60J106ME15D	muRata	Capacitor	10u	2
C2, C6, C8, C10, C11, C12, C13, C15, C17, C18, C19, C28, C29, C31	GCM155R71C104JA55D	muRata	Capacitor	0.1u	14
C3, C4, C5, C23, C24, C25, C26, C27	GRM155R61A105KE15J	muRata	Capacitor	1u	8
C9, C14, C20,	GRM155R71E103KA01D	muRata	Capacitor	0.01u	3
C16	GRT155R61C474KE01D	muRata	Capacitor	0.47u	1
C21	GRM1555C1H4R7BA01D	muRata	Capacitor	4.7p	1
C22, C30, C32	C1005X5R1A475M050BC	TDK	Capacitor	4.7u	3
CN1	SM20B-NSHDZS	JST	Connector	-	1
CN2	CAM-L05	MITSUMI	Connector	-	1
D1	SML-512MWT86	Kingbright	LED	-	1
D2, D3	SML-512WWT86	Kingbright	LED	-	2
D4, D5, D7	SML-512CWT86A	Kingbright	LED	-	3
D6	MBR0520LT1G	ON Semiconductor	Schottky Diode	-	1
L1	BLM15PD121SN1D	muRata	Inductor	10mH	1
L3	LQM2HPN4R7MGCL	muRata	Inductor	4.7uH	1
L2	DLP11SN900HL2L	muRata	Comm-Mode Choke Coil	90	1
Q1, Q2, Q3, Q4	DMN62D1LFB-7B	DiodesZetex	N-MOS FET	-	4
R1, R2, R3, R4, R5, R32	RGC1/16SC511DTH	KAMAYA	Resistor	510	6
R6, R7, R8, R11	RMC1/16SK103FTH	KAMAYA	Resistor	10k	4
R9, R10	RMC1/16SK512FTH	KAMAYA	Resistor	5.1k	2
R13, R14, R15, R18, R19, R20	RMC1/16SK104FTH	KAMAYA	Resistor	100k	6
R16	RMC1/16SK102FTH	KAMAYA	Resistor	1k	1
R21	ERA6AEB9533V	Panasonic	Resistor	953k	1
R22	RMC1/16SK105FTH	KAMAYA	Resistor	1M	1
R23	ERA3AEB2493V	Panasonic	Resistor	249k	1
R24	RK73H1ETTP2403F	KOA	Resistor	240k	1
SW1	SOV-168HST	MITSUMI	Switch	-	1
TH1, TH2, TH3, TH4, TH5, TH6, TH7, TH8, TH9, TH10, TH11, TH12, TH13, TH14, TH15, TH16	-	-	Through Hole	-	16
U2	S-1132B45-M5T1U	ABLIC	LDO	4.5V	1
U7 (*1)	LT1962EMS8	Linear Technology	LDO	5.9V	1
U1, U10	MM3376A33URE	MITSUMI	LDO	3.3V	2
U11	S-1318A12-M5T1U4	ABLIC	LDO	1.2V	1
U9 (*1)	LT1615ES5	Linear Technology	DC/DC	6.0V	1
U3	R5F10KGCAFB (R5F10KGCANA, R5F10JGCAFB)	Renesas	MCU	-	1
U5	FT234XD-R	FTDI Chip	FT234XD	-	1
U4, U6, U8, U12	74AVC4T774RSVR-NT	Texas Instruments	Level Shifter	-	4
X1	CSTNR6M00GH5L000R0	muRata	Xtal	6MHz	1

(*1) Not mounted.

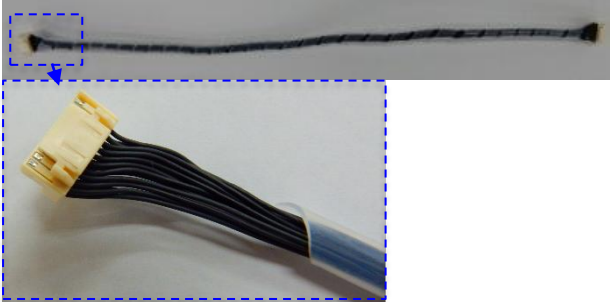
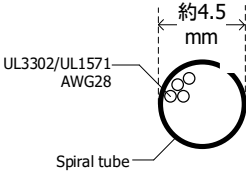
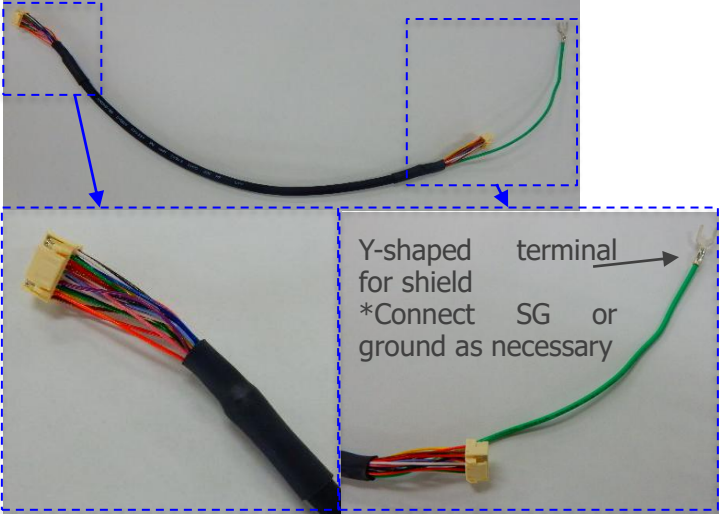
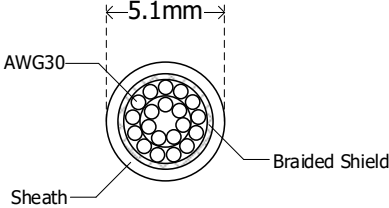
7-2 Conversion Board: MMS101B Conv.BD Ver.1.1

Designator	Model	Maker	Parts name	Value	Q'ty
C1, C3	GRM188R61E106KA73D	muRata	Capacitor	10u	2
C2	CGA3E2X7R1H104K080AA	TDK	Capacitor	0.1u	1
CN1	FH52K-20S-0.5SH	Hirose Electric	Connector	20pin	1
CN2	SM20B-NSHDZS	JST	Connector	20pin	1

7-3 Conversion Board: MMS101C Conv.BD Ver.1.0

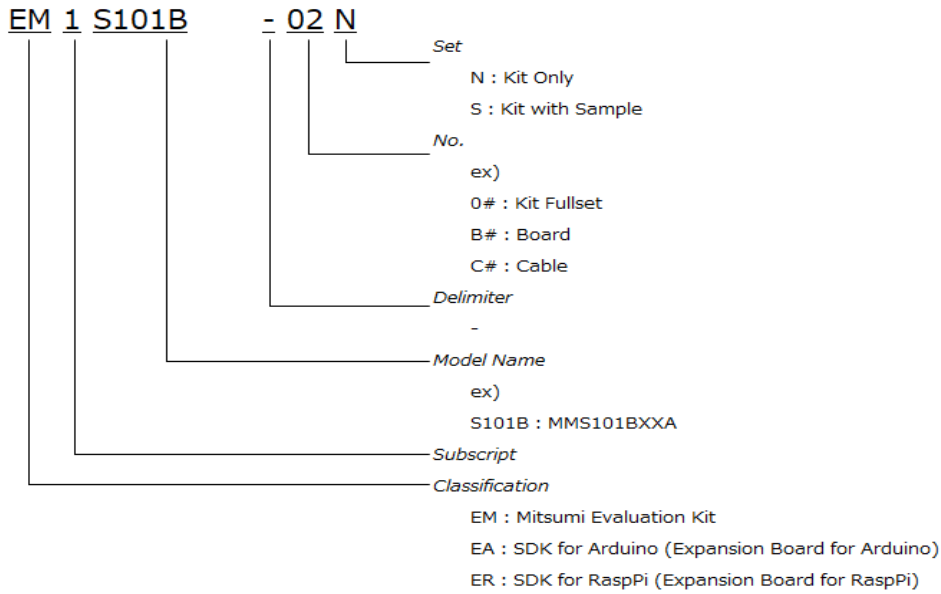
Designator	Model	Maker	Parts name	Value	Q'ty
C1, C3	GRM188R61E106KA73D	muRata	Capacitor	10u	2
C2	CGA3E2X7R1H104K080AA	TDK	Capacitor	0.1u	1
CN1	FH36W-15S-0.3SHW	Hirose Electric	Connector	15Pin	1
CN2	SM20B-NSHDZS	JST	Connector	20Pin	1

8 Cable Specification

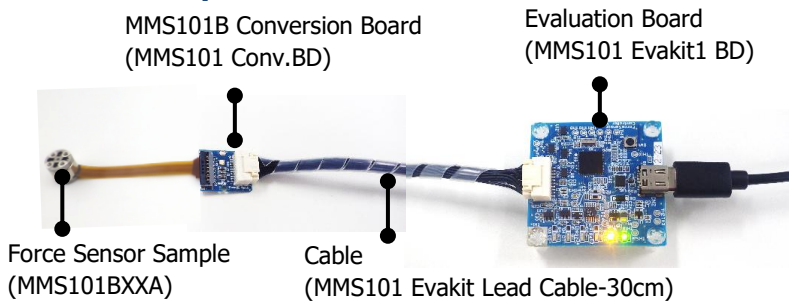
Cable Type	Cable length	Cable appearance
Lead cable	15, 30cm	<div><p>Cable line : UL3302 AWG28 (FURUKAWA ELECTRIC CO., LTD.) UL1571 AWG28 (OKI ELECTRIC CABLE CO., LTD.)</p><p>●</p><p>UL3302/UL1571 AWG28</p><p>Spiral tube</p><p>約4.5 mm</p><p>• Housing : NSHDR-20V-Z (J.S.T.MFG. CO., LTD)</p></div>
Robot cable	30, 60, 150cm	<div><p>Y-shaped terminal for shield *Connect SG or ground as necessary</p><p>Cable line : RMDHII-SB (21913) (DYDEN CORPORATION)</p><p>5.1mm</p><p>AWG30</p><p>Sheath</p><p>Braided Shield</p><p>• Housing : NSHDR-20V-Z (J.S.T.MFG.CO., LTD.) • Shade terminal (Y type) : 0.3Y-3 (NICHIFU CO., LTD.)</p></div>

9 Ordering Information

9-1 PO No. Description



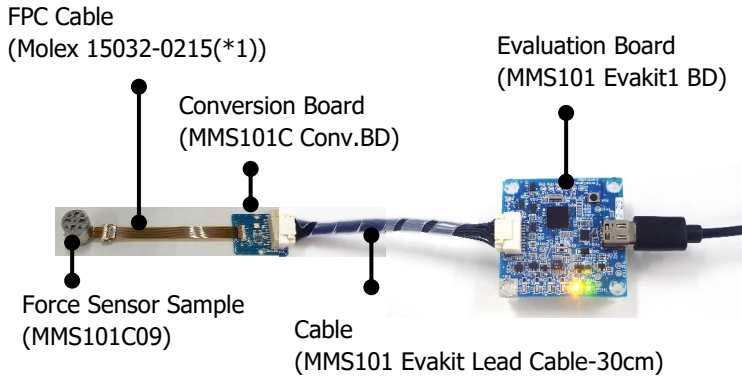
9-2 Lineup



PO No.	Details			Contents			
	Product Name	Kit Name	Set	Main Contents	Sample	Accessory1	Accessory2
MMS101B							
EM1S101B-02N	MMS101BXXA	MMS101B Evakit1	Kit Only	MMS101 Evakit1 BD	no	MMS101B Conv.BD	MMS101 Evakit Lead Cable 30cm
EM1S101B-02S	MMS101BXXA	MMS101B Evakit1	Kit with Sample	MMS101 Evakit1 BD	MMS101BXXA	MMS101B Conv.BD	MMS101 Evakit Lead Cable 30cm
EM5S101B-B1	MMS101BXXA	MMS101B Conv.BD	Accessory	MMS101B Conv.BD	-	-	-
EM5S101B-C1	MMS101BXXA	MMS101 Evakit Lead Cable 15cm	Accessory	MMS101 Evakit Lead Cable 15cm (*1)	-	-	-
EM5S101B-C2	MMS101BXXA	MMS101 Evakit Lead Cable 30cm	Accessory	MMS101 Evakit Lead Cable 30cm (*1)	-	-	-
EM5S101B-C3	MMS101BXXA	MMS101 Evakit Robot Cable 30cm	Accessory	MMS101 Evakit Robot Cable 30cm (*1)	-	-	-
EM5S101B-C4	MMS101BXXA	MMS101 Evakit Robot Cable 60cm	Accessory	MMS101 Evakit Robot Cable 60cm (*1)	-	-	-
EM5S101B-C5	MMS101BXXA	MMS101 Evakit Robot Cable 150cm	Accessory	MMS101 Evakit Robot Cable 150cm (*1)	-	-	-

MMS101B (Cable variation)							
EM1S101B-01N	MMS101BXXA	MMS101B Evakit1	Kit Only	MMS101 Evakit1 BD	no	MMS101B Conv.BD	MMS101 Evakit Lead Cable 15cm
EM1S101B-01S	MMS101BXXA	MMS101B Evakit1	Kit with Sample	MMS101 Evakit1 BD	MMS101BXXA	MMS101B Conv.BD	MMS101 Evakit Lead Cable 15cm
EM1S101B-03N	MMS101BXXA	MMS101B Evakit1	Kit Only	MMS101 Evakit1 BD	no	MMS101B Conv.BD	MMS101 Evakit Robot Cable 30cm
EM1S101B-03S	MMS101BXXA	MMS101B Evakit1	Kit with Sample	MMS101 Evakit1 BD	MMS101BXXA	MMS101B Conv.BD	MMS101 Evakit Robot Cable 30cm
EM1S101B-04N	MMS101BXXA	MMS101B Evakit1	Kit Only	MMS101 Evakit1 BD	no	MMS101B Conv.BD	MMS101 Evakit Robot Cable 60cm
EM1S101B-04S	MMS101BXXA	MMS101B Evakit1	Kit with Sample	MMS101 Evakit1 BD	MMS101BXXA	MMS101B Conv.BD	MMS101 Evakit Robot Cable 60cm
EM1S101B-05N	MMS101BXXA	MMS101B Evakit1	Kit Only	MMS101 Evakit1 BD	no	MMS101B Conv.BD	MMS101 Evakit Robot Cable 150cm
EM1S101B-05S	MMS101BXXA	MMS101B Evakit1	Kit with Sample	MMS101 Evakit1 BD	MMS101BXXA	MMS101B Conv.BD	MMS101 Evakit Robot Cable 150cm

(*1) This accessory has common specifications for both MMS101B and MMS101. It can be used with either.

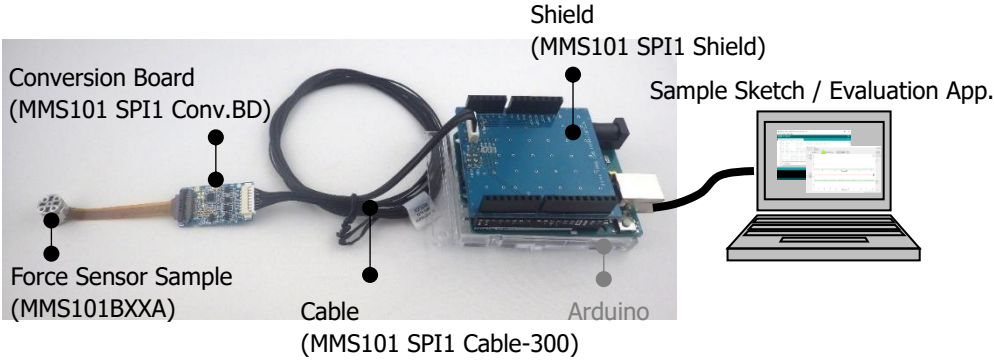
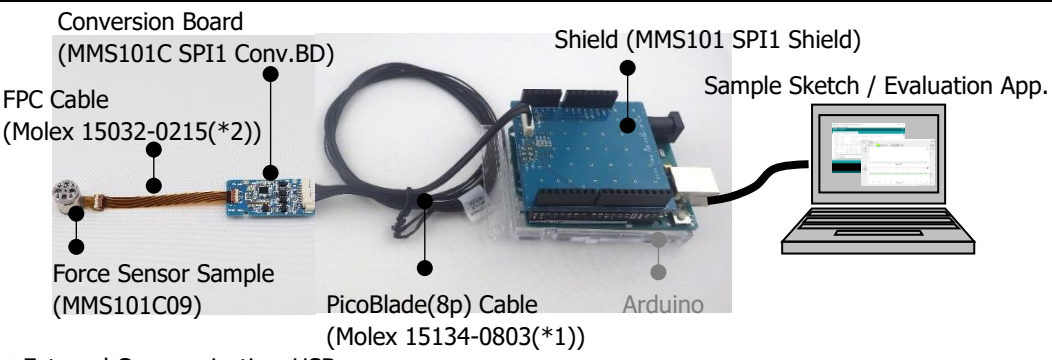
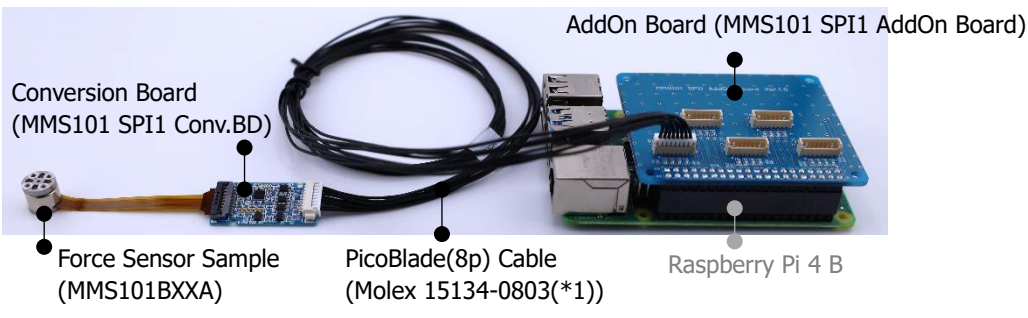
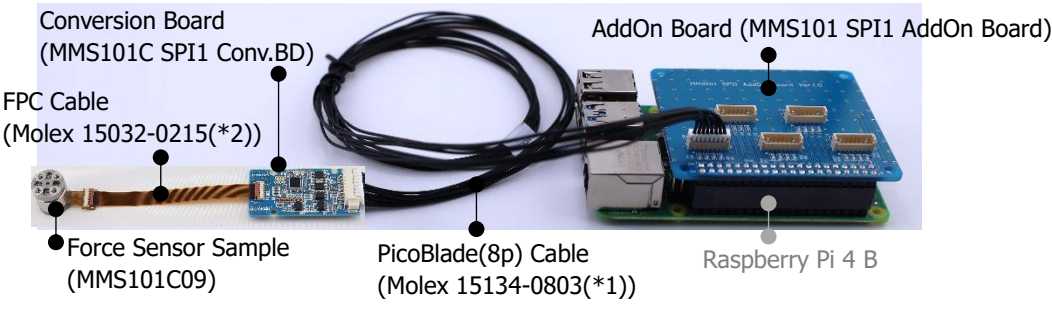


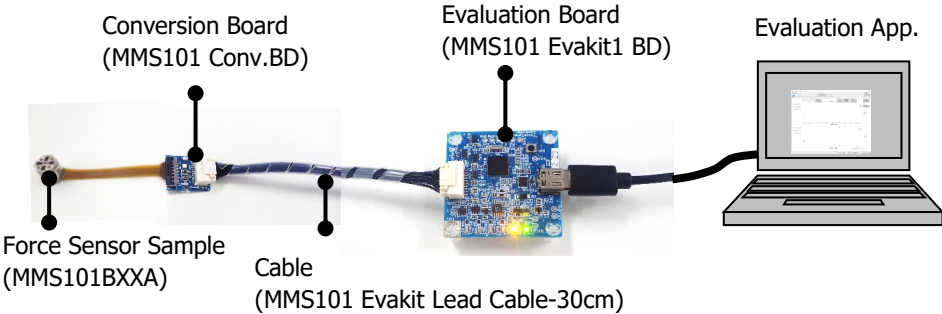
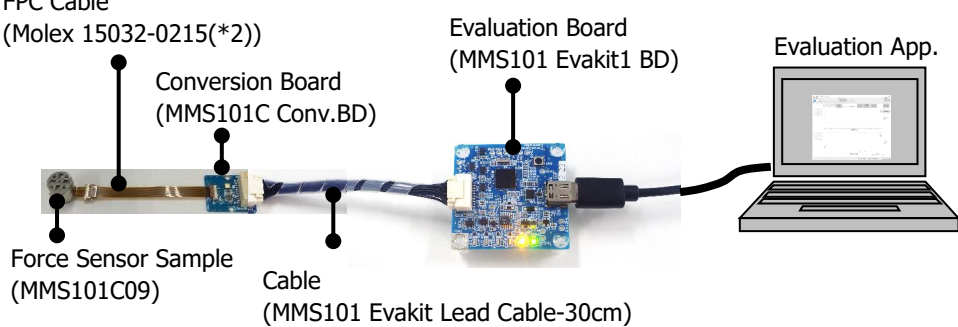
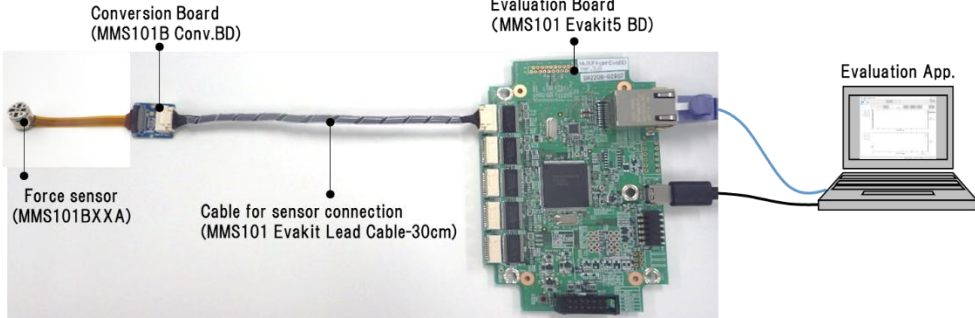
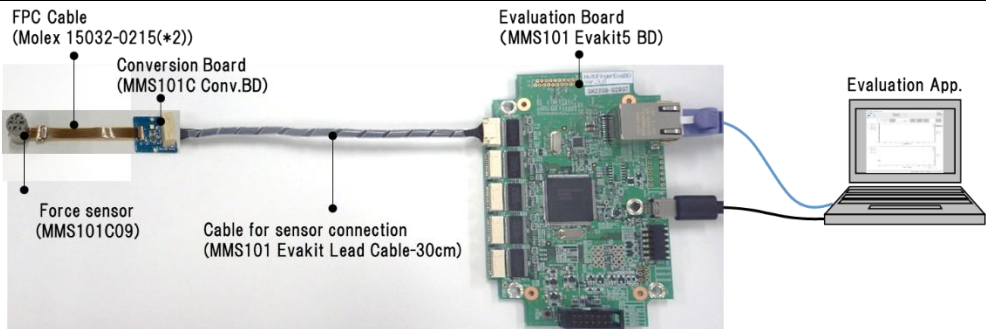
PO No.	Details			Contents			
	Product Name	Kit Name	Set	Main Contents	Sample	Accessory1	Accessory2
MMS101C							
EM1S101C-02N	MMS101C09	MMS101C Evakit1	Kit Only	MMS101 Evakit1 BD	no	MMS101C Conv.BD +FPC Cable (Molex 15032-0215(*1))	MMS101 Evakit Lead Cable 30cm
EM1S101C-02S	MMS101C09	MMS101C Evakit1	Kit with Sample	MMS101 Evakit1 BD	MMS101C09	MMS101C Conv.BD +FPC Cable (Molex 15032-0215(*1))	MMS101 Evakit Lead Cable 30cm
MMS101C (Cable variation)							
EM1S101C-01N	MMS101C09	MMS101C Evakit1	Kit Only	MMS101 Evakit1 BD	no	MMS101C Conv.BD +FPC Cable (Molex 15032-0215(*1))	MMS101 Evakit Lead Cable 15cm
EM1S101C-01S	MMS101C09	MMS101C Evakit1	Kit with Sample	MMS101 Evakit1 BD	MMS101C09	MMS101C Conv.BD +FPC Cable (Molex 15032-0215(*1))	MMS101 Evakit Lead Cable 15cm
EM1S101C-03N	MMS101C09	MMS101C Evakit1	Kit Only	MMS101 Evakit1 BD	no	MMS101C Conv.BD +FPC Cable (Molex 15032-0215(*1))	MMS101 Evakit Robot Cable 30cm
EM1S101C-03S	MMS101C09	MMS101C Evakit1	Kit with Sample	MMS101 Evakit1 BD	MMS101C09	MMS101C Conv.BD +FPC Cable (Molex 15032-0215(*1))	MMS101 Evakit Robot Cable 30cm
EM1S101C-04N	MMS101C09	MMS101C Evakit1	Kit Only	MMS101 Evakit1 BD	no	MMS101C Conv.BD +FPC Cable (Molex 15032-0215(*1))	MMS101 Evakit Robot Cable 60cm
EM1S101C-04S	MMS101C09	MMS101C Evakit1	Kit with Sample	MMS101 Evakit1 BD	MMS101C09	MMS101C Conv.BD +FPC Cable (Molex 15032-0215(*1))	MMS101 Evakit Robot Cable 60cm
EM1S101C-05N	MMS101C09	MMS101C Evakit1	Kit Only	MMS101 Evakit1 BD	no	MMS101C Conv.BD +FPC Cable (Molex 15032-0215(*1))	MMS101 Evakit Robot Cable 150cm
EM1S101C-05S	MMS101C09	MMS101C Evakit1	Kit with Sample	MMS101 Evakit1 BD	MMS101C09	MMS101C Conv.BD +FPC Cable (Molex 15032-0215(*1))	MMS101 Evakit Robot Cable 150cm
EM5S101C-B1	MMS101C09	MMS101C Conv.BD	Accessory	MMS101C Conv.BD +FPC Cable (Molex 15032-0215(*1))	-	-	-

(*1)The equivalent product is the Molex FPC cable (Model No. 15032-0215).

If you need additional purchases or different lengths, please use commercially available FPC cable.

9-3 Evaluation Kit List

Evaluation Kit Name	Configuration / Features
MMS101 SDK for Arduino	 <p>Force Sensor Sample (MMS101BXXA)</p> <p>Conversion Board (MMS101 SPI1 Conv.BD)</p> <p>Cable (MMS101 SPI1 Cable-300)</p> <p>Shield (MMS101 SPI1 Shield)</p> <p>Arduino</p> <p>Sample Sketch / Evaluation App.</p> <p>◆External Communication : USB</p> <p>◆Arduino is not included.</p>
	 <p>Force Sensor Sample (MMS101C09)</p> <p>FPC Cable (Molex 15032-0215(*2))</p> <p>Conversion Board (MMS101C SPI1 Conv.BD)</p> <p>PicoBlade(8p) Cable (Molex 15134-0803(*1))</p> <p>Shield (MMS101 SPI1 Shield)</p> <p>Arduino</p> <p>Sample Sketch / Evaluation App.</p> <p>◆External Communication : USB</p> <p>◆Arduino is not included.</p>
MMS101 SDK for Raspberry Pi	 <p>Force Sensor Sample (MMS101BXXA)</p> <p>Conversion Board (MMS101 SPI1 Conv.BD)</p> <p>PicoBlade(8p) Cable (Molex 15134-0803(*1))</p> <p>AddOn Board (MMS101 SPI1 AddOn Board)</p> <p>Raspberry Pi 4 B</p> <p>◆Up to five sensors can be connected.</p> <p>◆Raspberry Pi is not included.</p>
	 <p>Force Sensor Sample (MMS101C09)</p> <p>FPC Cable (Molex 15032-0215(*2))</p> <p>Conversion Board (MMS101C SPI1 Conv.BD)</p> <p>PicoBlade(8p) Cable (Molex 15134-0803(*1))</p> <p>AddOn Board (MMS101 SPI1 AddOn Board)</p> <p>Raspberry Pi 4 B</p> <p>◆Up to five sensors can be connected.</p> <p>◆Raspberry Pi is not included.</p>

MMS101 Evakit1	 <p>Conversion Board (MMS101 Conv.BD)</p> <p>Evaluation Board (MMS101 Evakit1 BD)</p> <p>Evaluation App.</p> <p>Force Sensor Sample (MMS101BXXA)</p> <p>Cable (MMS101 Evakit Lead Cable-30cm)</p> <p>◆External communication: USB</p>
	 <p>FPC Cable (Molex 15032-0215(*2))</p> <p>Conversion Board (MMS101C Conv.BD)</p> <p>Evaluation Board (MMS101 Evakit1 BD)</p> <p>Evaluation App.</p> <p>Force Sensor Sample (MMS101C09)</p> <p>Cable (MMS101 Evakit Lead Cable-30cm)</p> <p>◆External communication: USB</p>
MMS101 Evakit5	 <p>Conversion Board (MMS101B Conv.BD)</p> <p>Evaluation Board (MMS101 Evakit5 BD)</p> <p>Evaluation App.</p> <p>Force sensor (MMS101BXXA)</p> <p>Cable for sensor connection (MMS101 Evakit Lead Cable-30cm)</p> <p>◆External communication: Ethernet / USB</p> <p>◆Up to five sensors can be connected (Only in Ethernet).</p>  <p>FPC Cable (Molex 15032-0215(*2))</p> <p>Conversion Board (MMS101C Conv.BD)</p> <p>Evaluation Board (MMS101 Evakit5 BD)</p> <p>Evaluation App.</p> <p>Force sensor (MMS101C09)</p> <p>Cable for sensor connection (MMS101 Evakit Lead Cable-30cm)</p> <p>◆External communication: Ethernet / USB</p> <p>◆Up to five sensors can be connected (Only in Ethernet).</p>

(*1) The equivalent product is the Molex PicoBlade(8p) cable (Model No. 15134-0803).

If you need additional purchases or different lengths, please use commercially available PicoBlade(8p) cable.

(*2) The equivalent product is the Molex FPC cable (Model No. 15032-0215).

If you need additional purchases or different lengths, please use commercially available FPC cable.

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