Futaba

MPS08B-2307A

Injection Mold Internal Measurement

***Mold Marshalling System*■**

Instruction Manual

Model

MPS08B

pressure-measuring amplifier

●Thank you for your purchasing a product of Futaba Corporation.

●To ensure safe and correct use of this product, read this instruction manual thoroughly and understand it before starting.

●After reading this manual, keep it so that you can take it out as soon as necessary.

CE

With warranty

●The warranty is included in this manual.
Check the date of purchase, the name of the dealer, etc., and keep it in a safe place.

Major items

※ Analog Voltage Output Mode", a new function added to the measurement software Ver 1.2.0.0, is described in "P.28 3-2-9. Operation Mode Selection Screen" and "P.31 3-4-3. Analog Voltage Output Mode Setting.

Analog Voltage Output Mode ... Successor mode to the out-of-production MPV04

Contents

Introduction

Features of this product

"Mold Marshaling System MPS08B" which uses strain gauge-type pressure sensors is a resin pressure measurement and monitoring system for injection molding manufactured by Futaba Corporation.

Pressure waveform observation, data storage, and alarm monitoring settings can be performed on the PC using the supplied measurement software.

●**Increasing the number of measurement points**

MPS08B can be connected up to 4 units. The number of measurement points can be increased up to 32.

●**Sensor sensitivity setting**

Sensitivity setting of the pressure sensor is easy. (Simply enter numbers and symbols.)

●**Automatic data saving**

The waveform and history data of each shot are automatically saved to the hard disk of the PC.

Data can be saved to a USB memory even when a PC is not connected. The stored data is in CSV format and can be easily loaded using commercially available spreadsheet software.

●**Alarm monitoring**

When an alarm occurs, it can be used to sort defective products by outputting a signal to the take-out robot.

13 alarm monitoring items can be individually set for each channel.

●**Template waveform**

The pressure waveform stored in the past is displayed on the screen as a "template waveform" and can be compared with the waveform being measured.

It is possible to grasp visually and in real time "waveform matching of molding condition", "pressure variation in mass production" and "pressure change when molding condition is changed".

●**Modbus interface**

This unit is compatible with Modbus compliant communication protocols. Measurement data and configuration files can be uploaded to the factory network or the cloud using a commercially available gateway.

Additional functions and changes from previous model (MPS08)

●MPS08B can measure 4 channels of pressure as standard. Up to 32 channels can be simultaneously measured by adding up to four MPS08B amplifiers and eight junction box "UJP04H/UCP04" and junction cable "WJP0430HB".

●Heat-resistant junction box UJP04H (L/R/C) and Junction box with cable storage space UCP04 can be used.

●MPS08B can also monitor alarms by standalone and the measured data can be saved to a USB memory.

●Compared with the previous model, the size was reduced to 40% by volume and weight. Magnet mounting is now possible.

●RS485 interface supports MODBUS communication protocols.

●By making the sampling period course, the measurement time can be set up to maximum of 120,000 seconds.

●10 control signals can be connected for both input and output.

The input signal to MPS08B can be selected from NPN open collector or PNP open collector.

●Added a mode to output measured values in analog voltage only. (Succeeded from MPV04, which is no longer in production or sale)

Safety Precautions

These safety precautions are intended to prevent injury to yourself and others, as well as damage to property.

The precautions are indicated separately for "WARNING" and "CAUTION". Be sure to observe these precautions when using the product.

Warning

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

Caution

If the product is used without observing the information given under this symbol, minor injury or damage to the equipment may result.

Warning

●Do not disassemble or modify the product.

Failure to do so may cause a fire, electric shock, damage to the equipment or malfunction.

●Do not splash water on the sensor, amplifier, junction box, or junction cable.

Failure to do so may result in electric shock or short-circuit.

●Disconnect the power cable from the power outlet before installing equipment or connecting cables.

Failure to do so may cause an electric shock or malfunction.

●Do not use cables with broken wires or a damaged coating.

Failure to do so may cause a fire, electric shock, damage to the equipment or malfunction.

●Use the supplied AC adaptor.

Otherwise, it may cause damage or malfunction of the equipment.

Caution

●Insulate with relays, ground, etc., to protect the equipment connected to this unit.

If a malfunction occurs in this unit, the connected device or system may be damaged.

●When used in combination with other equipment, the effects on this unit should be fully considered.

Otherwise, this unit may not operate properly and may not produce the expected results.

●Before operating the molding machine, check the operation.

Failure to do so may result in equipment damage or malfunction.

1.System Installation and Wiring

1-1. Standard accessories

Before setting up the unit, make sure that all accessories are included.

The shape and name of the product may not match the figure due to a specification change or a change in the set product.

<table>
<tr>
<td> 
Pressure measurement amplifier
"MPS08B" 1 unit"</td>
<td> 
Heat-resistant junction box
"UJP04H L/R/C" 1 unit"</td>
<td>Or
 
Junction box with cable storage space
"UCP04" 1 unit"</td>
</tr>
<tr>
<td> 
AC adapter
"ES0024007 N-MVS08" 1 pc</td>
<td> 
Heat-resistant junction cable
(3m or 5m)
"WJP0430HB" 1 pc.</td>
<td> 
LAN cable (2 m)
"WCL0020" x 1</td>
</tr>
<tr>
<td> 
Signal Input/Output cable (3m)
"WCI0030-D25P-Y N-MPS08B" 1 pc.</td>
<td> 
Software CD-ROM
"PPSB" 1 pc.</td>
<td> 
Instruction Manual
(Booklet) 1 pc.</td>
</tr>
<tr>
<td>Guarantee
User Registration Sheet 1 sheet</td>
<td></td>
<td></td>
</tr>
</table>

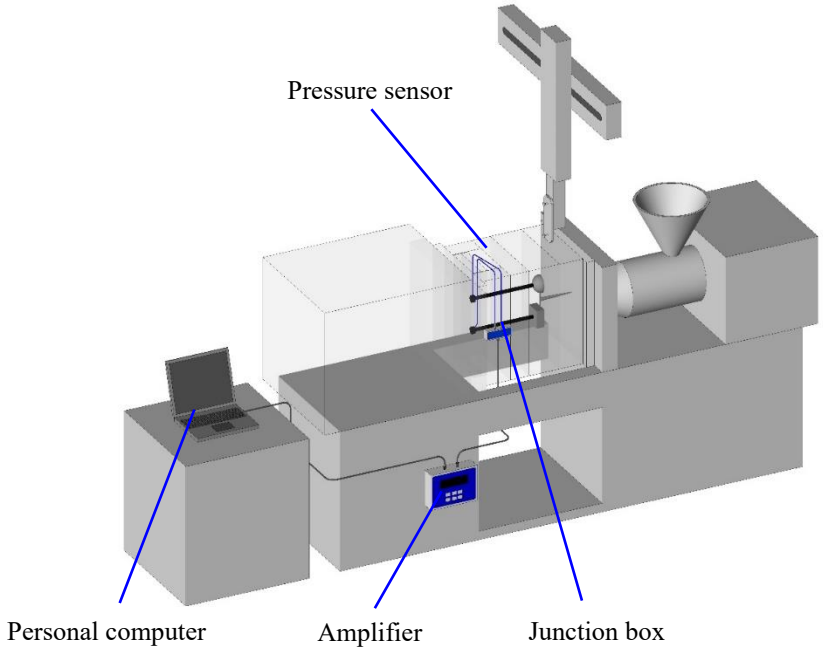
1-2. System configuration

The basic system configuration of the molded marshalling system "MPS08B Series" is as follows.

Connect a strain gauge type pressure sensor to a junction box that can be connected to 4 channels and connect it to the amplifier via junction cable.
Connect the amplifier to the PC in which the measurement software is installed using LAN cable.
Measurement starts, alarm signal output, and alarm signal cancellation can be automated by using the supplied signal I/O cable and connecting to the machine and peripheral control equipment.
Pressure waveform measurement is also possible by connecting the optional voltage output cable to a commercially available data logger.

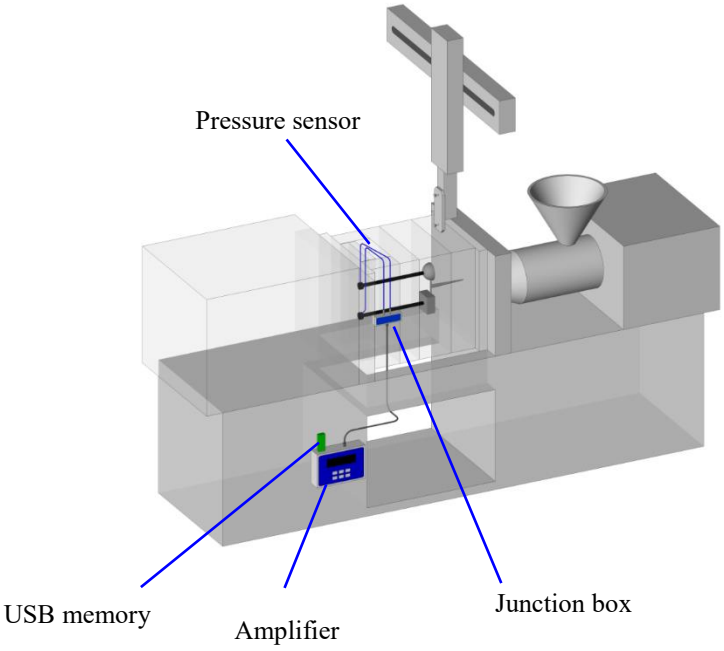
(1) When connecting the amplifier (MPS08B) to a computer at all times

●Save the measurement data to a computer.
(If a USB memory is inserted, the data is saved in both the PC and the USB memory.)



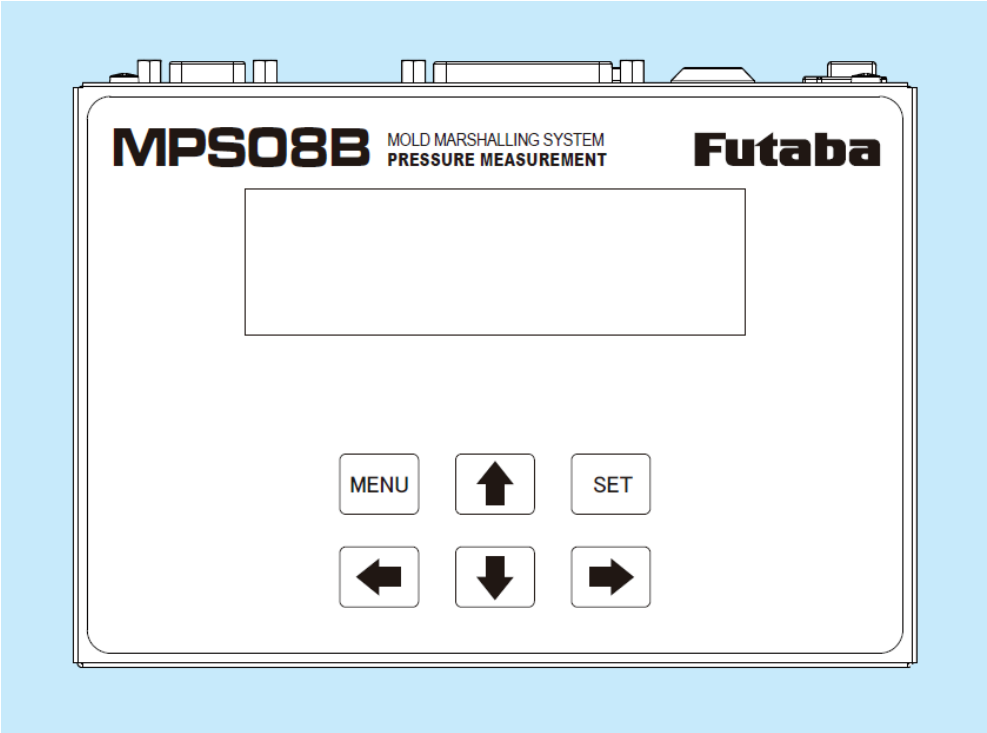
(2) When using the amplifier alone (the PC is connected only when setting conditions)

●Saves the measured data to USB memory.



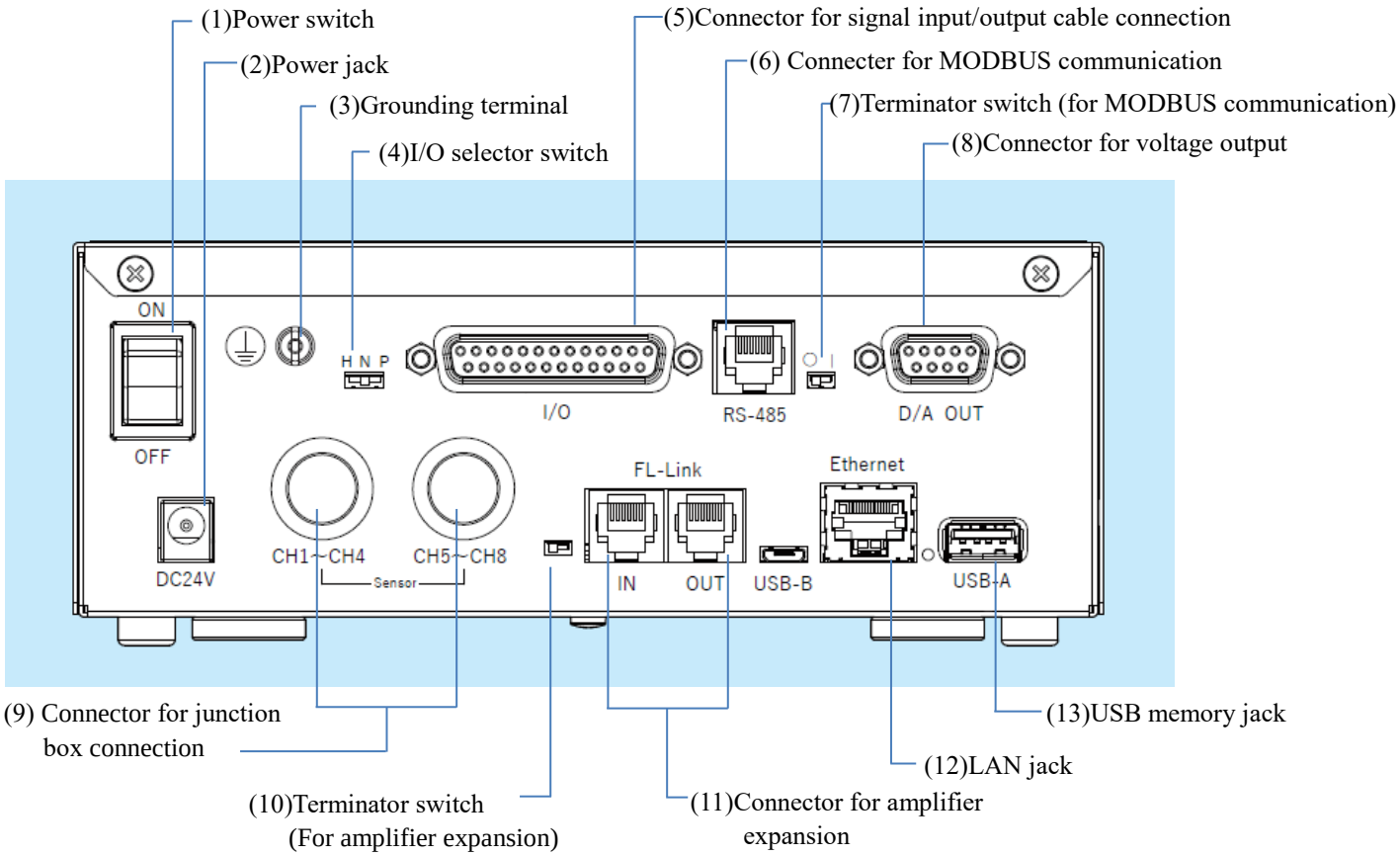
1-3. Names and functions of parts

1-3-1. Display panel



Display panel	Displays the measurement status, setting file name, shot counter, setting conditions in the amplifier, etc.	
Operation key	「MENU」： 「→」/「←」： 「↑」/「↓」： 「SET」：	Switching of display contents. Cancels the changed value. Change Settings. Moving the cursor When changing the setting, change each selection. Normal: Confirms the changed setting. In monitor mode: Starts measurement as a manual trigger.

1-3-2. Connector layout



(1)	Power switch	Turns the power ON/OFF.
(2)	Power jack	Connect AC adaptor terminals.
(3)	Grounding terminal	Terminal for grounding connection.
(4)	I/O selector	INPUT can be switched as follows. N : IN1-10 all NPN operations P : IN1-10 all PNP operations H : IN1-5 operates in PNP, and IN 6-10 operates in NPN.
(5)	Connector for signal input/output cable connection	Trigger signal input, alarm cancellation signal input, and alarm signal output.
(6)	Connecter for MODBUS communication	RS-485 communication port. Connects to an external device such as a PLC.
(7)	Terminator switch (for MODBUS communication)	Used for MODBUS communication during amplifier expansion. (without expansion in ○) For amplifier expansion, only MPS08B of end of connection put in |.
(8)	Connector for voltage output	The measured pressure value is output with an analog voltage. Connects to external measurement devices such as data loggers and oscilloscopes.
(9)	Connector for junction box connection	Use a dedicated junction cable to connect to junction box. Two junction boxes can be connected to one amplifier “MPS08B".

(10)	Terminator switch (For amplifier expansion)	Used for amplifier expansion. (without expansion in ○) 2 units connected: 2 units |. 3 units connected: 1st unit and 3rd unit to |, 2nd unit to ○ 4 units connected: 1st unit, 4th unit |, 2nd unit, 3rd unit ○
(11)	Connector for amplifier expansion	Connector for connecting multiple amplifiers.
(12)	LAN jack	Use a LAN cable to connect to PC.
(13)	USB memory jack	Connect a commercially available USB flash drive (Type-A). USB 2.0 High-speed 480 Mbps FAT 32 format Allocation unit size: Use 32KB. Use a USB stick for industrial equipment. USA3-008GH(D00PJ) made by Hagiwara Solutions recommended

1-4. Installation of Amplifier and Junction Box

Caution

Do not turn on MPS08B until all connections and settings have been made.

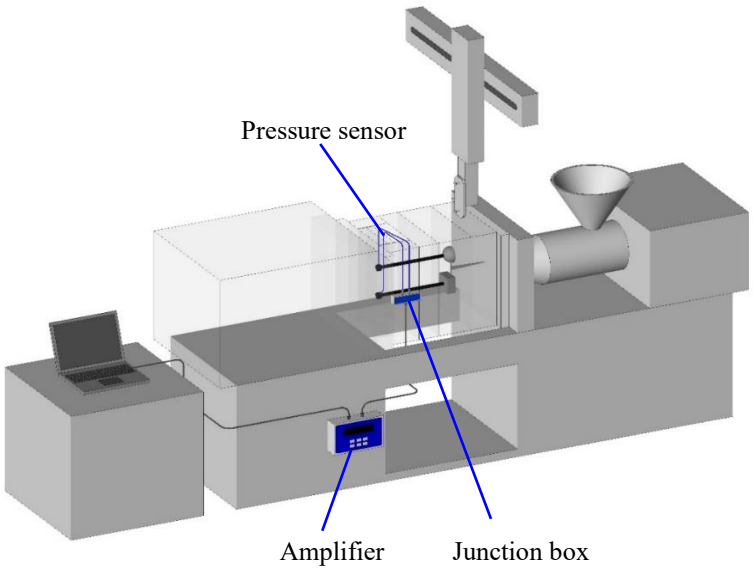
The heat resistance temperature of junction box UJP04H and Junction box with cable storage space UCP04 is 120°C, and the operating temperature of MPS08B is 0 to 50°C.

Avoid locations where temperatures exceed the specified range. Otherwise, malfunction or failure may result.

Position MPS08B main unit and junction box considering the cable routing.

Be careful not to pull or pinch the pressure sensor cable or junction cable while the molding machine is in operation.

If necessary, use commercially available cable fixing parts.



1-4-1. Installation of pressure sensor

Refer to the "Pressure Sensor Installation Reference Diagram" included with the pressure sensor for instructions on how to install the pressure sensor to the mold.

1-4-2. Installation of relay boxes

(1) Heat-resistant junction box

Attach to the periphery of the molding machine in one of the following ways.

①Screw directly onto the periphery of the molding machine. (M4 hole drilling required)

②Secure onto the periphery of the molding machine using magnets (optional).

③Use commercially available mounting brackets (brackets, L-shaped angles, etc.) to secure it.

●When using magnets, fix them firmly so that the magnets do not come off from junction box.

●When installing on a mold, use at 120°C or less.

(2) Junction box with cable storage space

Attach to the mold.

●Refer to "UCP04 Wiring Assembly Procedure" for more information on how to install.

●Use at a mold temperature of 120°C or less.

1-4-3. Amplifier installation

Place it on a dedicated stand or attach it to the periphery of the molding machine with the magnets on the bottom.

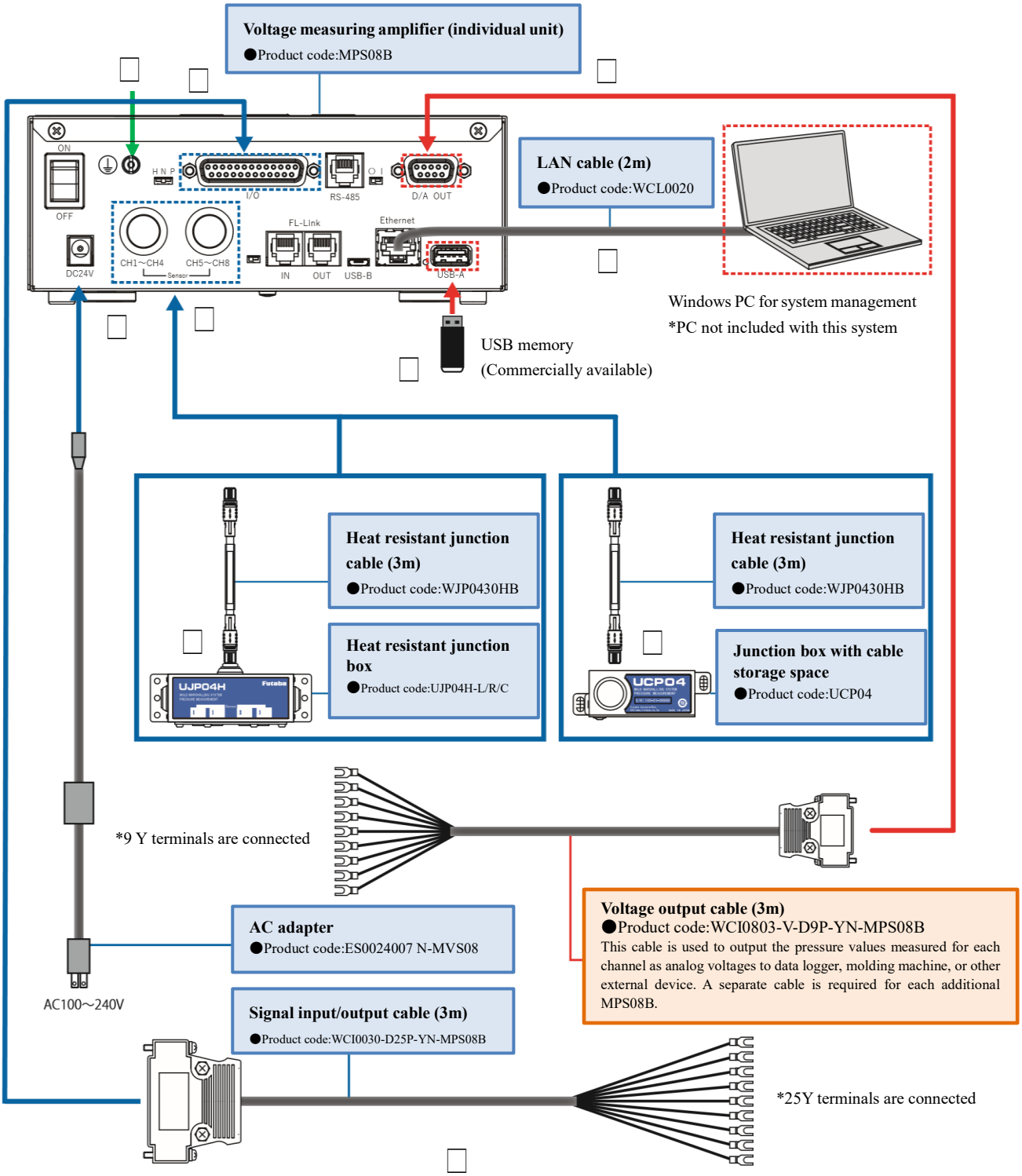
●Pay attention to the ambient temperature of MPS08B (0 to +50°C).

1-5. Connecting the Pressure Sensor and Each Cable

Connect each device as shown in the basic configuration diagram below.

Connect the power supply only after all connections have been completed. Refer to "Connecting the Power Supply" (page 15).

1-5-1. Basic configuration diagram



Up to 32 points can be measured by connecting up to 4 MPS08B and 8 junction boxes.

1-5-2. Connecting Devices

Follow the procedure below to connect the devices. (The following procedure numbers correspond to the numbers in the basic configuration diagram.)

(1) Connecting pressure sensor to junction box

Connect the plug of the pressure sensor to the 【CH1】～【CH4]】port of junction box.

Align the red mark on the plug of the pressure sensor with the red mark on the plug insertion slot of junction box and insert it firmly as far as it will go.

※When disconnecting the sensor from the junction box, slide the sensor in the direction opposite to the direction marked with red.

Pulling out the cable may cause cable breakage or damage.

(2) Connecting junction cable and junction box

Connect the connector without the ferrite core of junction cable to the rear port of junction box.

Align the direction of the junction cable connector and insert it all the way.

※When disconnecting the junction cable from the junction box, slide the cable connector part in the opposite direction of the insertion point and pull it out.

Pulling out the cable may cause cable breakage or damage.

(3) Connecting junction cable to MPS08B

Connect the connector with the ferrite core of junction cable to MPS08B.

Insert the cable connector into the 【CH1 - CH4】 or 【CH5 - CH8】 port, aligning the direction of the connector.

●If the number of sensors to be measured is 4 or less, connect it to the 【CH1 ～ CH4】.

※When disconnecting the junction cable from the MPS08B, slide the slide mechanism of the cable connector part in the opposite direction to that of insertion and disconnect it.

Pulling out the cable may cause cable breakage or damage.

(4) Connecting LAN Cable to MPS08B and PC

Connect LAN cable to LAN port on MPS08B and to LAN port on PC.

(5) Connecting the I/O Cables to MPS08B

Connect the I/O cable to the [I/O] port on MPS08B. Tighten the screws on both sides of the connector to secure it.

(6) Connecting MPS08B to the molding machine

Connect MPS08B to the molding machine using the input/output cable.

Refer to "Circuit-Specification of I/O Signals" (P.13).

(7) Connecting AC adaptor and MPS08B

Connect AC adaptor into MPS08B's power jack.

(8) Connecting MPS08B to an external measuring instrument

Connect to external measuring equipment as necessary. Voltage corresponding to the pressure value can be output. (20 MPa = 1 V)

Connect the optional "Voltage output cable (3 m)" (Product code: WCI0830-V-D9P-Y N-MPS08B) to the D/A output port on the MPS08B.

(9) Connecting to the grounding terminal

Be sure to ground the product to ensure stable operation.

(10) Connecting a USB memory

Connect it if necessary.

If both PC and USB are connected, the measurement data will be saved in both.

※The format of the USB memory used should be File System: FAT32, Allocation Unit Size: 32KB.

Use USB memory for industrial equipment. The USB memory device we have tested is USA3-008GH (D00PJ) for industrial equipment made by Hagiwara Solutions. (2s cycle, 1s measurement, 1ms sampling)

There are a wide variety of USB memories on the market. These commercially available USB memory devices may cause write delays or data loss due to the write speed to the USB memory device. These are not covered by the warranty.

1-5-3. Connecting Input Signals

An input signal is a signal that is input to MPS08B from an external device such as a molding machine.

There are three types of signals : "Start trigger signal", "Alarm clear signal" and "Control signal".

(1) Start Trigger signal

It is required to start measurement.

Connect the incoming signal with no pressure loaded on the sensor. This is because "zero-point reset" is performed at the same time as the start trigger signal is input.

●If there is no special reason, connect the "mold close signal".

(2) Alarm clear signal

Connect when clearing (canceling) alarm signals being output from the MPS08B.

Connect it as necessary.

●The alarm signal can be automatically cleared by specifying the time in the software settings.

●If there is no problem in operation due to automatic cancellation by the specified time, the connection of the alarm clear signal can be omitted.

(3) Control signal

Connect when controlling MPS08B by external signals.

Connect it as necessary.

There are three selectable options: " Disabled Trigger ", " Disabled Alarm" and " Disabled Save".

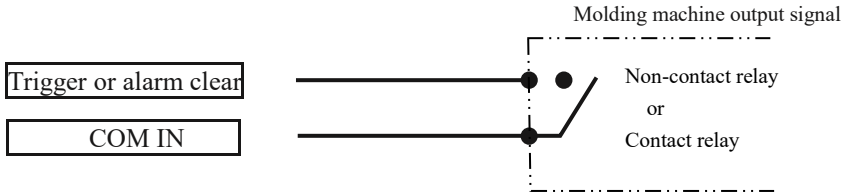
If there is no control from an external device, the connection of control signals can be omitted.

Input circuit

For input (trigger, alarm clear) to the MPS08B, use a no-voltage signal that is output on/off by a contact relay.

MPS08B may not operate properly when the variable voltage is applied.

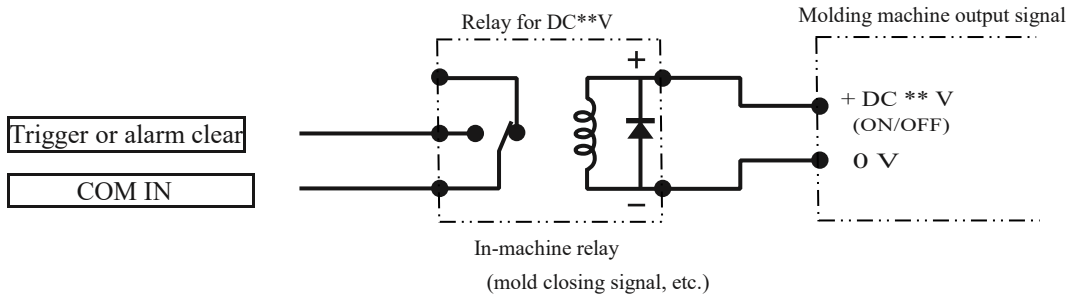
Example 1: When the output signal of the connected molding machine is "Contact output."



Example 2: When the output signal of the connected molding machine is "voltage output."

Connect via a relay that matches the voltage of the machine output signal.

When using a reed relay, use a type with a built-in circuit for absorbing coil surge.



1-5-4. Connecting Output Signals

The output signal is the signal that is output from MPS08B to an external device such as a molding machine.

(1) Alarm output signal

An alarm signal is output when pressure exceeds the monitoring range set by the software.

Used to determine defective products, stop the molding machine, or control external devices.

●Monitoring can be set individually for 8 channels, and alarm output signals can also be output individually. (with 10 output ports)

(2) Control signal

Used to output signals for shot end, production complete, continuous error, and alarm enable.

●Threshold settings for various control signals are made in the system settings.

(A control signal is output at the set threshold value.)

(3) Waveform monitoring

Used for V-P switching signal or for mold opening signal by mold internal pressure.

●The pressure-threshold setting for V-P switching is set by alarm monitoring condition setting.

(The control signal is output at the timing when the set pressure value is reached.)

(4) OK Alarm

Signal is output when the pressure is within the alarm monitoring range.

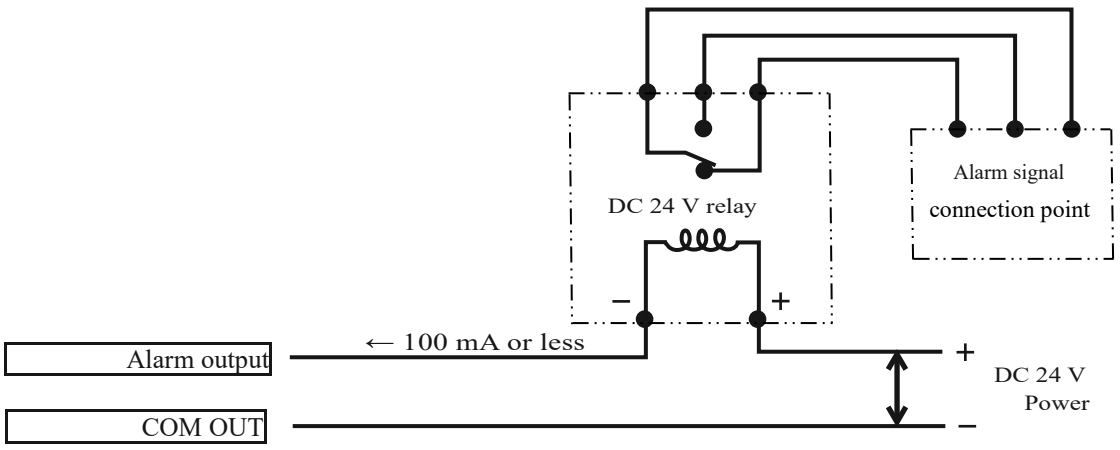
Output Circuit

The alarm output from MPS08B is a contact output by the photo relay. Use a compatible device as the output destination.

In addition, use a separate power supply for that equipment that is on a different system from that of the molding machine, with the - side connected to GND.

e.g., using DC 24 V power and DC 24 V relay

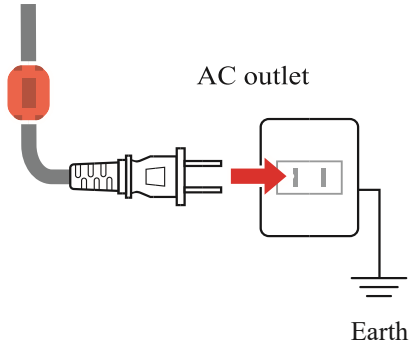
When using a reed relay, use a type with a built-in circuit for absorbing coil surge.



1-5-5. Connecting to the power supply

Caution

The supplied AC adaptor has a working power voltage between AC100 and 240 V. Do not connect if the power supply voltage is outside the above voltage range or if the voltage at each terminal of the power supply has a potential that exceeds the power supply voltage with respect to ground.



- ●Use only the supplied AC adapter. Do not use the AC adapter for other equipment.
- ●MPS08B has a power switch. Turn on the switch after the connection is completed.
- ●Allow the system to warm up for at least 30 minutes after turning on the power.
- ●If the warm-up is insufficient, the measured values may not be stable.
- ●The power supply and measured values may not be stable at sites where noise-producing equipment such as induction motors and electric welding machines are used. Depending on the situation, implement noise countermeasures by using a commercially available noise cut transformer or similar device.

1-6. Pin number of the connector for connection

1-6-1. Connector for I/O "DSUB25 connector"

Wire the signal cable from the machine used for signal input/output to MPS08B to the Y terminal of the signal input/output cable.

●In order to continuously measure the pressure waveform in the mold according to the molding cycle, at least wiring of the trigger signal (e.g., mold closing signal) is required.

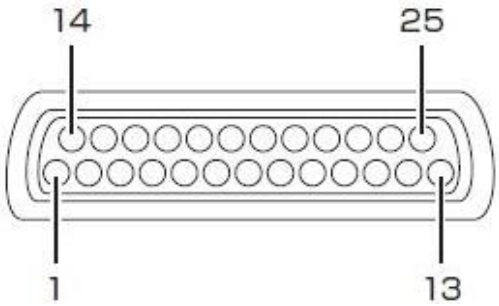
●The zero point is reset at the same time as the trigger signal is input. It takes about 0.1 second to reset the zero point. If "Injection start signal" is set as the trigger signal, the zero point may not be reset in time and normal measurement may not be performed.

●Use a non-voltage signal that is turned on/off by a contact relay for inputting (trigger, alarm clear) to MPS08B.

●MPS08B may not operate properly when the variable voltage is applied.

●The alarm output from MPS08B can be switched between NO (normally open) and NC (normally closed).
Use the corresponding device as the output destination. In addition, use a power supply for that equipment alone that is on a different system from that of the molding machine, with the - side connected to GND.

DSUB25 connector pin connection



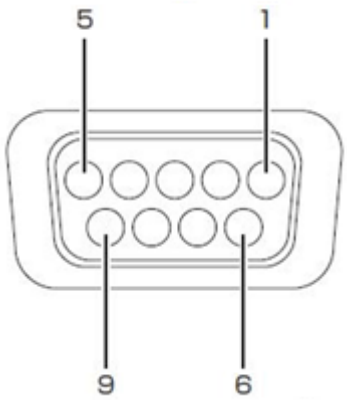
Terminal No.	Signal name	Mark tube Notation	Terminal No.	Signal name	Mark tube Notation
1	GND(1～5)	GI_1-5	14	GND(1～5)	GO_1-5
2	Input port 1 (Default□ Trigger 1)	IN1	15	Output port 1 (Default□ Alarm)	OUT1
3	Input port 2 (Default □ Alarm clear)	IN2	16	Output port 2	OUT2
4	Input port 3	IN3	17	Output port 3	OUT3
5	Input port 4	IN4	18	Output port 4	OUT4
6	Input port 5	IN5	19	Output port 5	OUT5
7	GND(6～10)	GI_6-10	20	GND(6～10)	GO_6-10
8	Input port 6	IN6	21	Output port 6	OUT6
9	Input port 7	IN7	22	Output port 7	OUT7
10	Input port 8	IN8	22	Output port 8	OUT8
11	Input port 9	IN9	24	Output port 9	OUT9
12	Input port 10	IN10	25	Output port 10	OUT10
13	Free space	(without notation)	-	-	

1-6-2. Analog voltage output connector

If necessary, analog voltage output to external measuring equipment is possible. Voltage corresponding to the pressure value can be output.

(20MPa=1V)

●Connect the optional "Voltage output cable (3m)" (Product code: WCI0830-V-D9P-Y N-MPS08B) to the 【D/A Output】port of MPS08B.

Terminal No.	Signal name	DSUB9 connector Pin connection
1	CH1 analogue voltage-output	
2	CH2 analogue voltage-output	
3	CH3 analogue voltage-output	
4	CH4 analogue voltage-output	
5	CH5 analogue voltage-output	
6	CH6 analogue voltage-output	
7	CH7 analogue voltage-output	
8	CH8 analogue voltage-output	
9	Common to GND	

1-7. Connecting when extending the amplifier (increasing the number of channels)

Up to 32 points can be measured by connecting up to four MPS08B.

For details on how to expand the amplifier, see "8-3. Operation When Expanding the Amplifier" (P.84).

2.Preparing the Software

2-1. Recommended Computer System Requirements

OS (Japanese compatible)	Windows8(32bit・64bit) Windows8.1(32bit・64bit) Windows10(32bit・64bit)
Processor	Intel-manufactured CPU Core i5 or higher
Required memory	More than 4GB
Other	The Ethernet port must be included and.NET Framework 4.8 or higher must be installed.

※Recommended PC

Regarding the PC on which the measurement software is to be installed, we have provided the recommended specifications, but we assume that the PC is to be used exclusively for measurement.

In addition, the operation warranty does not cover problems regarding shutdowns caused by PC settings or Windows OS, or problems caused by high-load operation or high-load communication by other applications.

2-2. Installing PPSB Measurement Software

2-2-1. Installation by executable file

There is no installer.　It is an executable file system (extension: .exe).

Execute the executable file when starting the measurement software.

●A CD-ROM containing the executable file (MPS08B_Application) is enclosed with this instruction manual.

●Create a folder named MPS08B on the desktop or elsewhere and store the executable file.

※The latest version of the current software is "Ver:1.2.0.0".

The latest version can be downloaded from our HP.

https://mms.mtb.futaba.co.jp/

2-2-2. Data saving folder

This section describes the folder for saving measurement data.

(1) MMS_DATA

This folder stores waveform data and numeric history data.

The MMS_DATA folder is automatically created at the timing of updating or saving the setting file.

●The location created is in the folder that contains the executable file.

(2) Settings

This is the folder where the setting file is saved.

The Settings folder is automatically created when the "Settings" button is clicked on the main operation screen of the measurement software.

●The location created is in the folder that contains the executable file.

●**The setting file stores sensor sensitivity information, measurement conditions, alarm monitoring conditions, and other information in a batch.**

Normally, a setting file is created and managed for each mold.

2-2-3. Setting storage file

(1) Init.xml

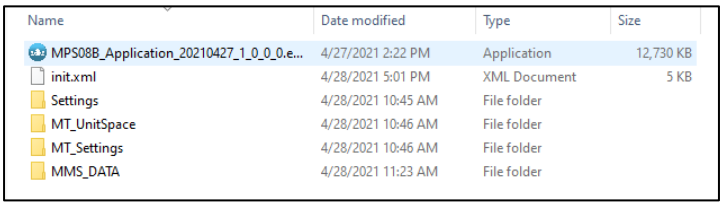
This file is used to store various settings.

Save the last setting (conditions such as the color of the pressure axis and measurement channel, and the shading of the waveform) when the measurement software is finished. Init.xml is automatically generated when you exit PPSB.

●The location created is in the folder that contains the executable file.

2-2-4. Folders and Files

The following folders and files are saved in the folder where the executable file is stored.



2-3. Network settings

MPS08B and measuring PCs are connected by LAN (Ethernet) communication.

Network settings for communication are required.

The procedure is described below. (This section describes the steps for Windows10.)

Connecting 2-3-1. MPS08B and Measuring PC

Connect the supplied LAN cable to the LAN port of each MPS08B and measuring PC.

Both MPS08B and the computer start up.

Checking IP address of 2-3-2. MPS08B

Press ↓ key on MPS08B main unit (press ↓ key once from the startup screen) to open IP address screen.

●The default values are as follows:

IP address :192.168.2.3

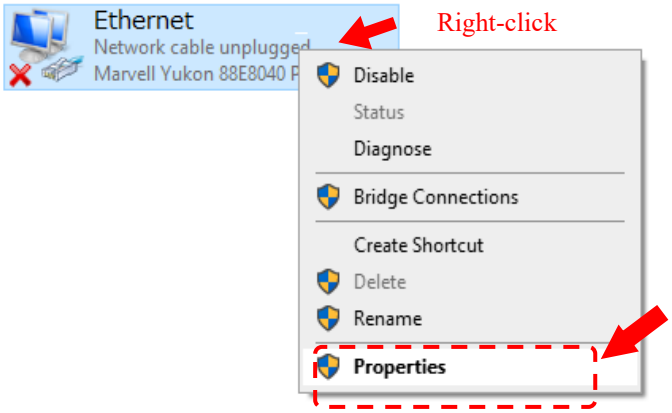
Subnet mask: 255.255.255.0 (fixed)

2-3-3. Set IP address of the measurement PC.

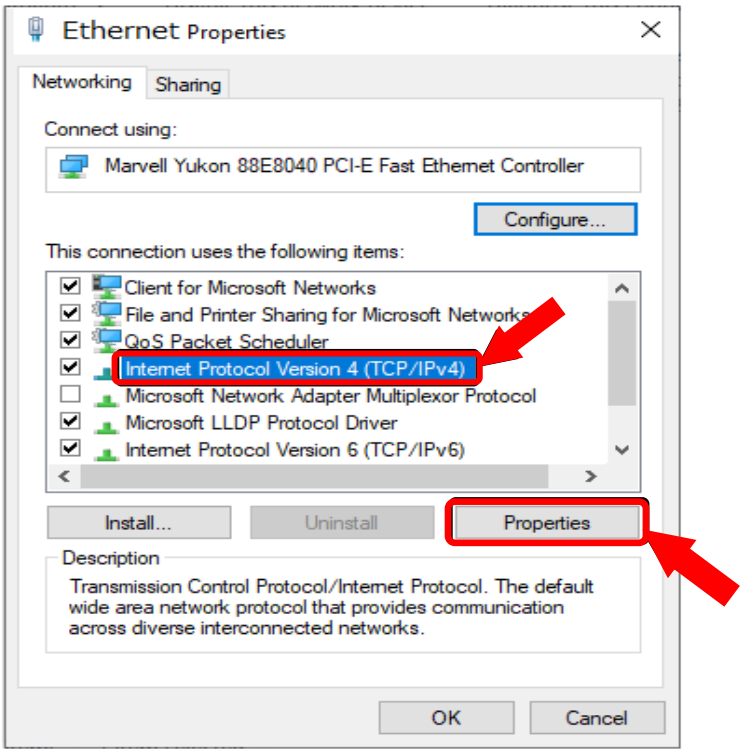
(1) Start menu ⇒ Control Panel ⇒ Network and Sharing Center
⇒ Open Change Adapter Settings. "Ethernet" is displayed.

(2) Right-click Ethernet ⇒ Open Properties.

.



(3) Click "Internet Protocol Version 4 (TCP/IPv4)" and then click "Properties".

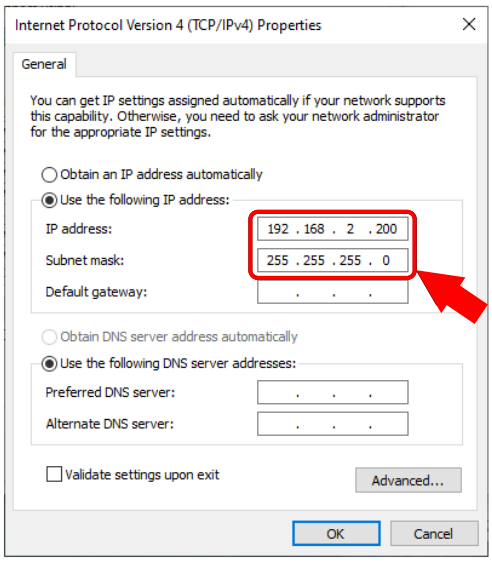


(4) In the General tab, click Use the following IP address and type

IP address: 192.168.2.200

Subnet mask: 255.255.255.0 (fixed)

Default gateway: None

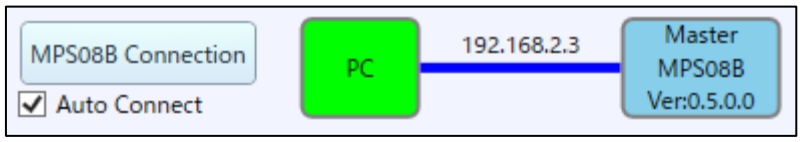


2-3-4. Start PPSB measurement software.

Establish communication between PPSB and MPS08B.

Select the "Auto Connect" checkbox at the top of PPSB window or press "MPS Connect" to perform communication.

When communication is established, "MPS08B" is displayed in light blue as shown in the figure below.



※Updated from the software version shown above, the current version is "Ver:1.2.0.0".

●If there is no particular reason, put a □ in "Auto-connect".

Communication will be performed automatically at the next software startup.

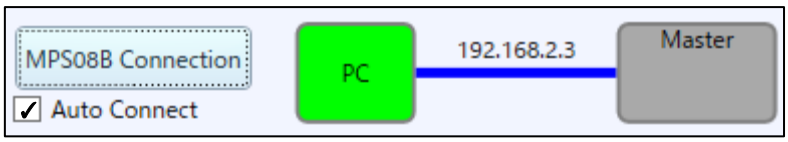
2-4. Communication and Operation Check

Check the operation of each device after network setting is completed.

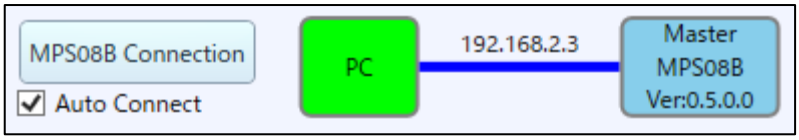
2-4-1. Communication check

The communication status can be checked by the color of the indicator on the measurement software operation screen.

(1) State in which communication is not in progress



(2) Communicating status

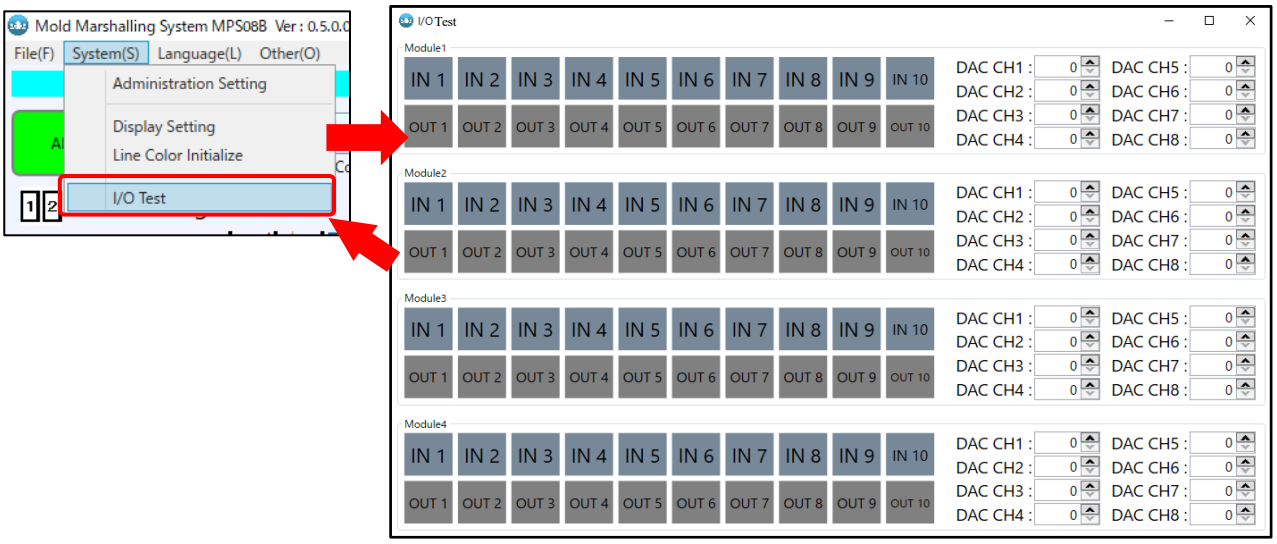


※Updated from the software version shown above, the current version is "Ver:1.2.0.0".

2-4-2. I/O signal detection status (I/O test) and voltage-output operation check

Check the operation of I/O and voltage-output signals between MPS08B and connected devices.

Clicking "System" □ "I/O Test" in the File menu to display the "I/O Test" window.

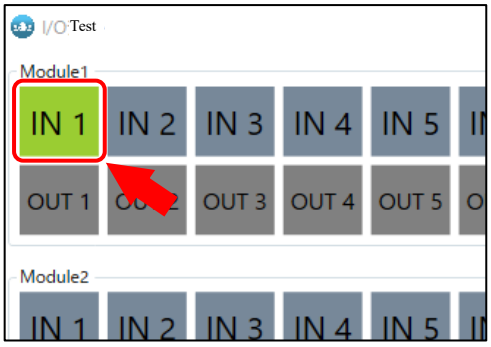


(1)Input signal detection check

Inputs the input signal (trigger or alarm clear) manually.

(Example: Short-circuit No.1 and No.2 of the signal I/O cable, etc.)

When input is correct, the corresponding signal name lights yellow green.



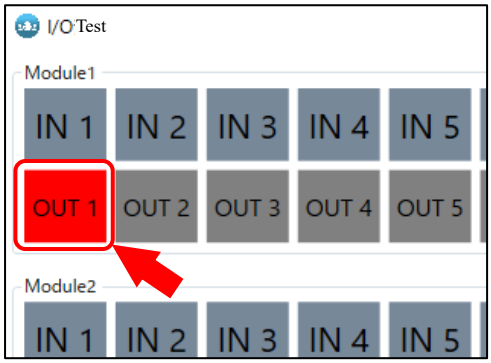
(2)Output signal detection check

Outputs an output signal (alarm) manually.

When the "OUT" button is pressed, the background color of the corresponding signal name is changed to blue and an alarm signal is outputted.

Check whether MPS08B is outputting signals normally on the device of the output destination.

(Example: Connecting a patrol light or buzzer, etc.)

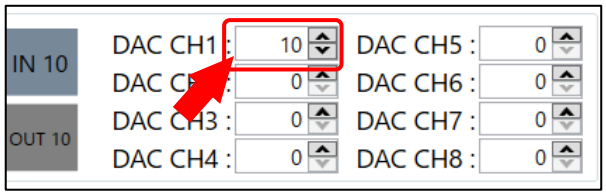


(3)Voltage output operation check

Outputs the analog voltage manually.

Connect a commercially available data logger or digital multimeter using a voltage output cable (sold separately) and input any output voltage value to each channel.

Check if the voltage output from MPS08B is received properly.



2-4-3. Simple operation check of pressure measurement

To perform a simple check to see whether the sensor is operating or not, refer to "8-2 Measurement in Maintenance Mode" (p. 83).

2-5. MPS 08 B updating firmware

The software in the MPS08B (hereinafter referred to as "firmware") and the measurement software in the PC must always be a combination of the latest versions.

When the measurement software is updated, be sure to update the firmware of the amplifier.

●Care should be taken when performing measurements on a PC containing the latest measurement software and the amplifiers introduced in the past.

The procedure is described below.

2-5-1. Prepare the latest PPSB

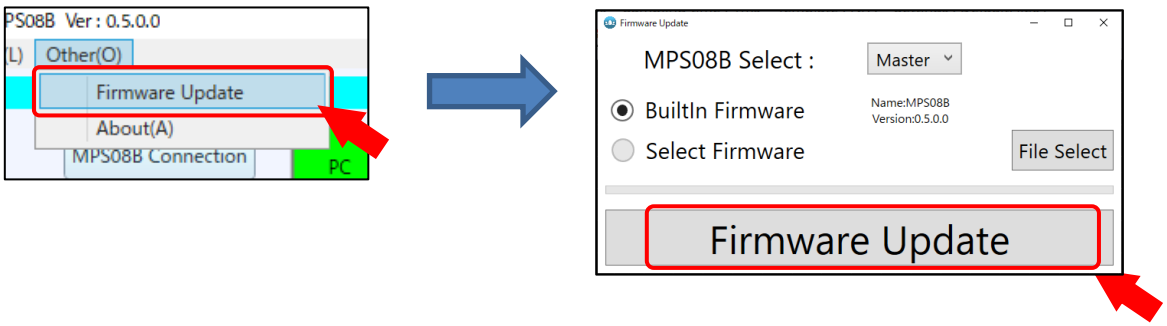
Activate the PPSB and establish communication with the MPS08B.

2-5-2. Specifying and Updating Firmware

(1)From the File menu, click Other □ Firmware Update.

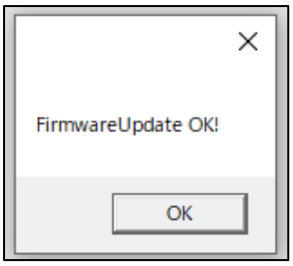
●Typically, select Built-in Firmware.

●Do not turn off the power of the main unit while updating the firmware.



※Updated from the software version shown above, the current version is "Ver:1.2.0.0".

(2)The unit restarts and the update are completed.

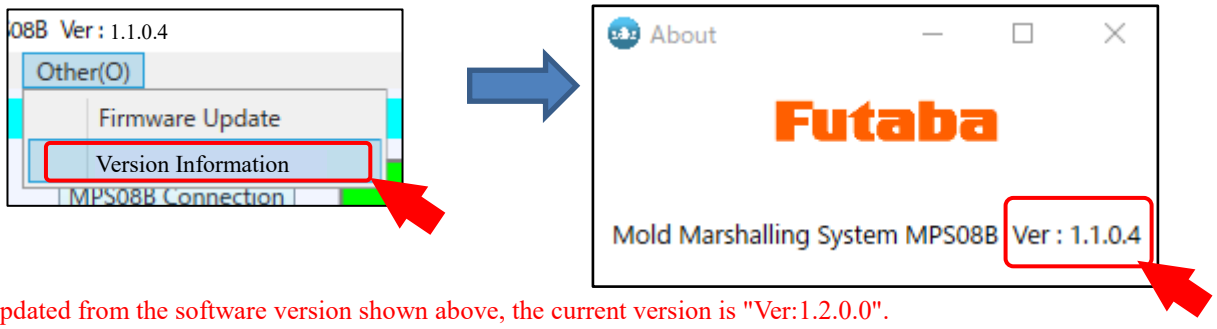


2-5-3. Checking the measurement software and firmware version

Check whether the version number is the same.

(1) Checking the version of the measurement software

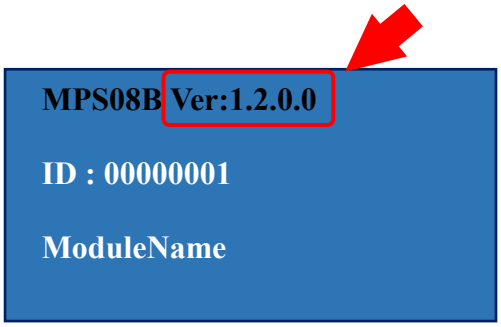
From the File menu, click Other □ Version Information.



※Updated from the software version shown above, the current version is "Ver:1.2.0.0".

(2)Checking the firmware version

The version can be checked by pressing a key on the MPS08B. Press the ↓ key seven times from the startup screen.



3.Operating the Amplifier (MPS08B)

This section describes the basic operations of this machine.

3-1. Starting the amplifier

Turn on the power switch.

The start-up screen is displayed on the liquid crystal display on the display panel.

●The power switch should be turned ON after all wiring has been completed.

3-2. Key switch and liquid crystal display

This is used when checking or changing MPS08B setting, or when starting measurement manually.

●Pressing the MENU key allows the user to move between screens.

●The → key allows the user to select an item, the MENU key allows the user to cancel the changed value, and the SET key allows the user to confirm the value.

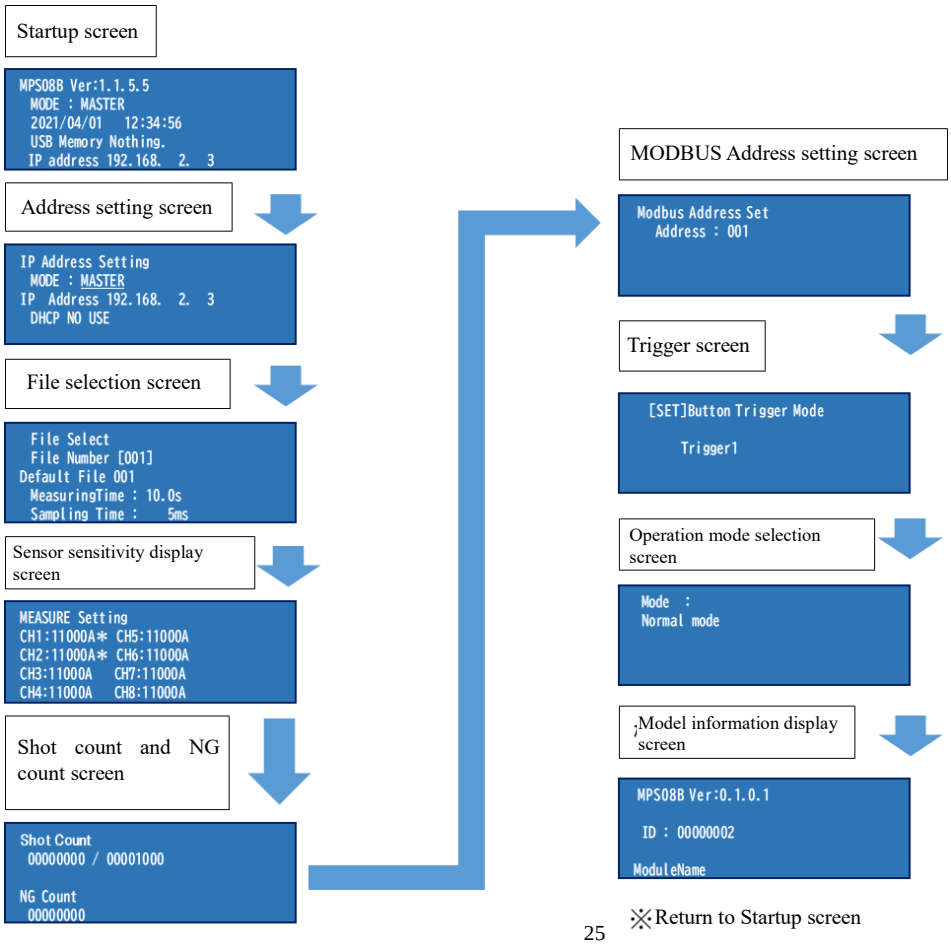
●Initialize the device by pressing and holding the ↑ and ↓ keys at the same time and turning the power switch OFF-ON.

The screen transition and setting method are shown below.

3-2-1. Screen transition

Pressing the MENU key allows the user to move between screens.

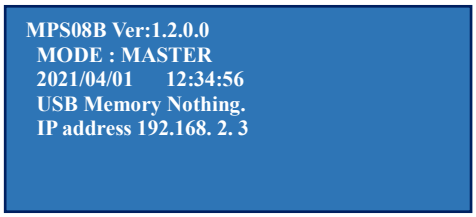
The display transitions in the following order.



3-2-2. Startup screen

On the startup screen, you can check the model version, operation mode, date and time, presence or absence of USB, and presence or absence of LAN.

●When LAN is connected to this unit, the set IP address is displayed.



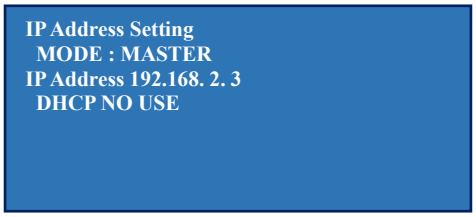
Press MENU to open the "Address Setting" window.

3-2-3. Address setting screen

In the address setting screen, the master-slave mode, address, and DHCP can be set. The currently selected item will flash and a _ will appear below it.

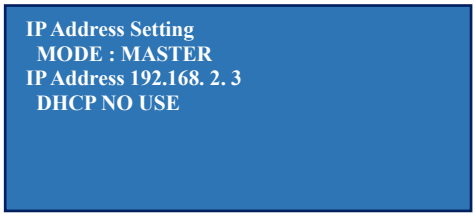
(1) Setting MASTER (Base Unit) or SLAVE (Slave Unit)

Press the → key to blink MASTER, use the ↑ and ↓ keys to change to MASTER, SLAVE1, SLAVE2, or SLAVE3, and press the SET key to set.



(2) IP address change

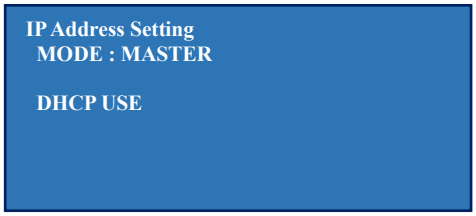
Press the→ key twice to change the IP address. Select a digit with the ←key and → key, change the value with ↑ key and ↓ key, match the desired IP address, and then press the key SET to set the IP address. The currently selected number blinks and a __ appears below.



(3) Setting DHCP

When → button is pressed again after the end of the IP-address is pointed, DHCP can be set.

Use ↑ or ↓ buttons to change the setting to USE or NO USE and press the SET key.



※DHCP: IP address auto assignment function

Press MENU to open the "File Selection" screen.

3-2-4. File selection screen

The file selection screen allows the user to check the number and name of the currently selected setting file.

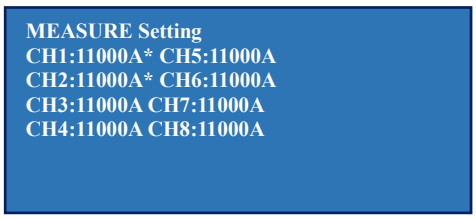
In addition, the measurement time and sampling time can be checked.

●Press the → key, select the setting file number with the ↑ key or ↓ key, and press SET key to set.

Press MENU to open the "Sensor Sensitivity Display" screen.

3-2-5. Sensor sensitivity display screen

The sensor sensitivity setting can be checked. * is displayed for CH connected to the sensor.



Press MENU to open the "Shot Count and NG Count" screen.

3-2-6. Shot count and NG count screen

Shot count and NG count can be checked.

The default shot count is the number of shots produced (1000).

To change the setting, use the measurement software.

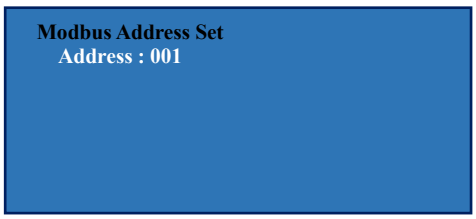
Press the ↓ key to open the "MODBUS Address Setting" screen.

3-2-7.Modbus address setting screen

Allows the user to set Modbus address setting.

●Press the → key to set Modbus setting.

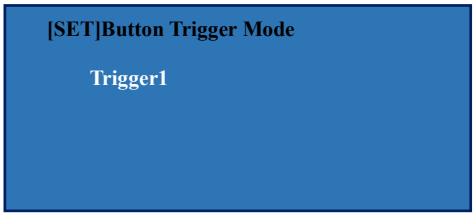
Use the ↑ key or the ↓ key to change the setting, and press SET key.



Press MENU to open the "Trigger" screen.

3-2-8. Trigger screen

Trigger presets can be changed, and triggers can be displayed on the software.



●Select the trigger number with the →key and ← key, and the trigger signal is output at the timing when the SET key is pressed.

Press MENU to open the "Operation Mode Selection" screen.

3-2-9. Operation Mode Selection screen

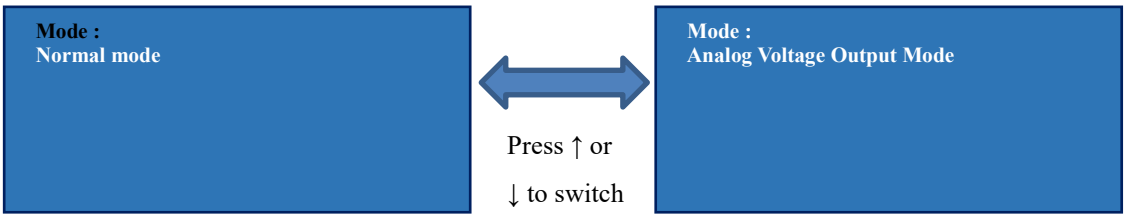
Normal mode and Analog voltage output mode can be set.

※What is "Normal Mode" and "Analog Voltage Output Mode"

- Normal mode → Normal measurement mode using PC.
  It is set to Normal Mode at the factory.
- Analog voltage output mode
  →Mode in which only voltage output is performed. Various settings can be made with the amplifier without PC connected.

●Press the → key to set Normal mode and Analog voltage output mode.

Use the ↑ key or the ↓ key to change the mode, and press SET key.

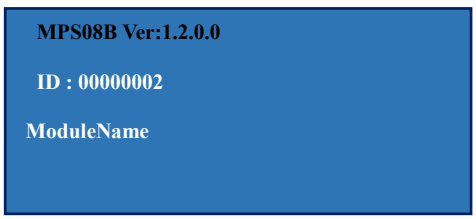


※Refer "P31 3-4-3. Analog voltage output Settings" for detailed Analog voltage output mode settings.

Press MENU to open the "Model Information display " screen.

3-2-10. Model information display screen

The model version, model ID, and model name can be checked.



Press MENU to open the "Startup" window.

3-2-11 Initialization method

（1） Turn OFF the power with MPS08B unit.

（2） Turn ON MPS08B while pressing both the ↑ and ↓ keys.

（3） After the display panel lights up for about 20 seconds, the system shifts to normal startup.

This resets the factory default settings.

3-3. Using the amplifier alone

MPS08B can monitor on its own even if it is not always connected to a PC.

However, when using for the first time, you need to connect to a PC and save the setting file to the amplifier.

The setting file is created and saved using the measurement software.

●100 setting files can be saved in the amplifier.

3-3-1. Operation Flow

The following describes the operation procedure when using the amplifier alone.

(1) After connecting all the devices, start the measurement software to set the measurement conditions.

(2) Save the settings changed by the measurement software to MPS08B and exit the measurement software.

(3) Turn OFF the power with MPS08B unit.

(4) Disconnect LAN cable from MPS08B.

(5) Turn ON MPS08B.

(6) Select the measurement conditions to be used by operating MPS08B.

This completes the setup, and when the trigger is input, measurement starts (and monitoring, if monitoring is set).

3-4. Saving data to USB memory

Waveform data and log files can be saved to USB memory when MPS08B is used alone.

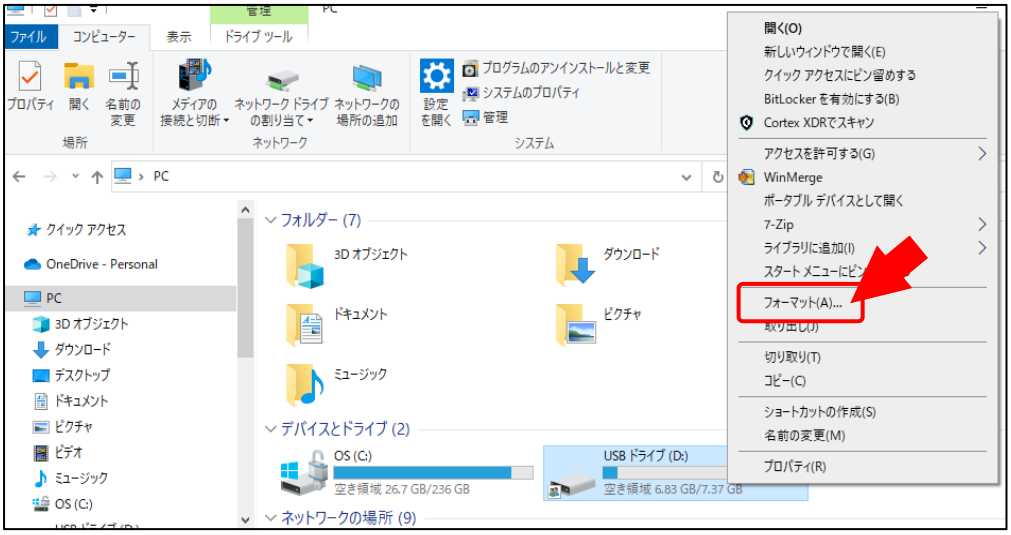
●Insert USB memory while the amplifier is turned off.

●Format should be FAT32, Memory 64GB, Allocation Unit Size 32KB.

●Use USB memory for industrial equipment.

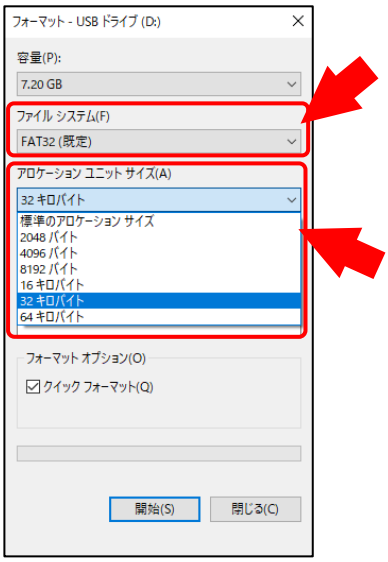
※How to change the file system and allocation unit size of USB memory

(1) Insert the USB memory into the PC to be used, and select "Explorer" ⇒ "USB drive" Right-click ⇒ "Format".



(2) Set "File System" ⇒ FAT32, "Allocation Unit Size" ⇒ 3KB, and "Start".

※Note that the data saved in USB memory is deleted when it is formatted.



※ The USB memory we have tested is USA3-008GH (D00PJ) manufactured by Hagiwara Solutions for industrial equipment, and we have confirmed its operation (2s cycle, 1s measurement, 1ms sampling).

Various types of USB memories are available on the market.

Writing delays, data loss, etc. may occur due to the writing speed of these commercially available USB memory devices and are not covered by the warranty.

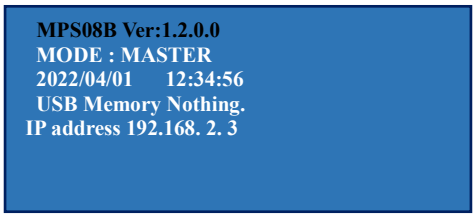
3-4-1. Data save destination folder

When measurement is started while using the amplifier alone, a folder for measurement data (folder name: MMS) is automatically created in the USB memory.

3-4-2. Liquid crystal display

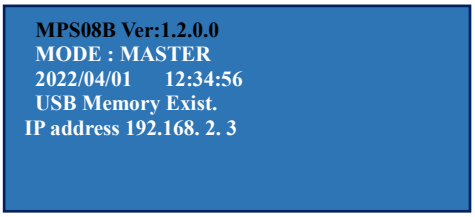
The status of USB memories inserted into the amplifiers can be checked on the liquid crystal screen (startup screen).

(1) USB memory is not inserted.



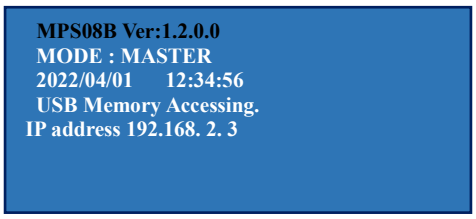
●"USB Memory Nothing." is displayed.

(2) USB memory is inserted.



●When USB memory is recognized correctly, "USB Memory Exist." is displayed.

(3) Writing data to USB memory

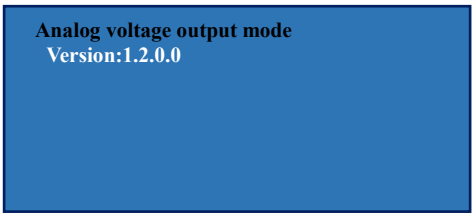


●"USB Memory Accessing." is displayed.

●Accessing is displayed from measurement starts until the measurement and the writing of the data is completed.

3-4-3.Analog Voltage Output Mode setting

※Select "Analog voltage output mode" on "P.28 3-2-9. Operation mode selection screen.

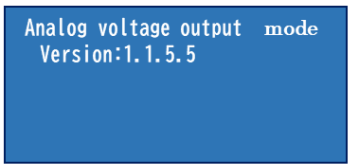


●Screen Transitions in Analog Voltage Output Mode

Pressing the MENU key allows the user to move between screens.

The display transitions in the following order.

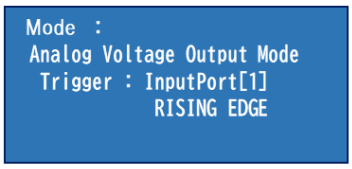
Analog Voltage Output Mode
Startup screen



Each CH sensitivity setting screen

※CH1 to 10
Switching by MENU key

Operation mode selection and trigger setting screen



※Analog Voltage Output Mode
Return to Startup screen

(1) Setting of CH sensitivity classification

To adjust for individual differences in the connected pressure sensor, the sensitivity classification is used as the input setting.

Sensitivity is indicated on the sensor connector (image below).

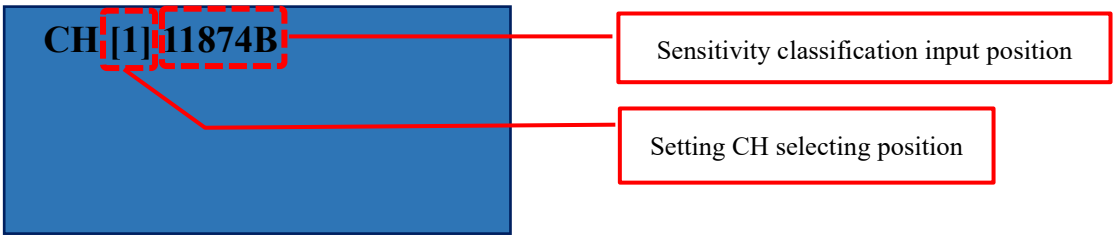
●Press MENU to move to CH display.

Press the → key to change the settings. The selection target (cursor) flashes.

Use the → and ← keys to align the cursor (flashing), and use the ↑ and ↓ keys to change the setting.

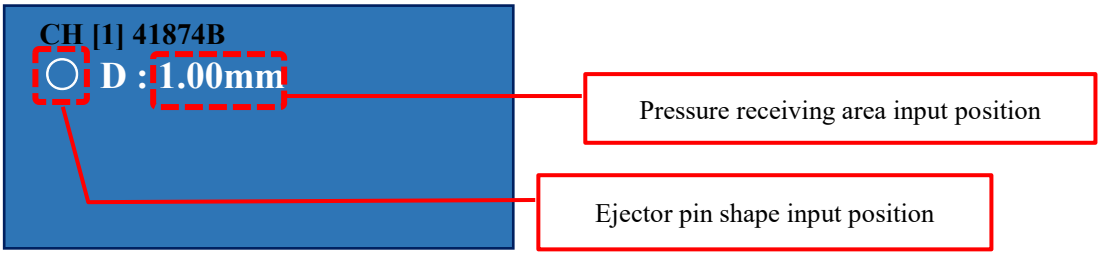
●Set the sensitivity classification of the connected sensor for each CH.

First, select the target CH number, and then enter the sensitivity classification.



●For button-type sensors.

For the pressure sensor button type, the input items of the ejector pin shape and pressure receiving area are displayed in the lower row.



○:Select when the pressure receiving surface is a round pin. Enter the diameter D mm.

[]:Select when the pressure receiving surface is a square pin. Enter the dimension mm of the two sides of the pressure receiving surface.

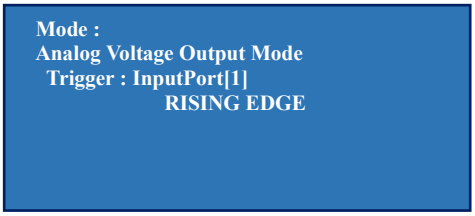
S:Select when inputting pressure receiving surface by area. Enter the area mm ² of the pressure receiving surface.

●Press SET key to confirm.

※The sensitivity classification settings for Analog Voltage Output Mode can be made all at once by pressing SET after all inputs have been completed.

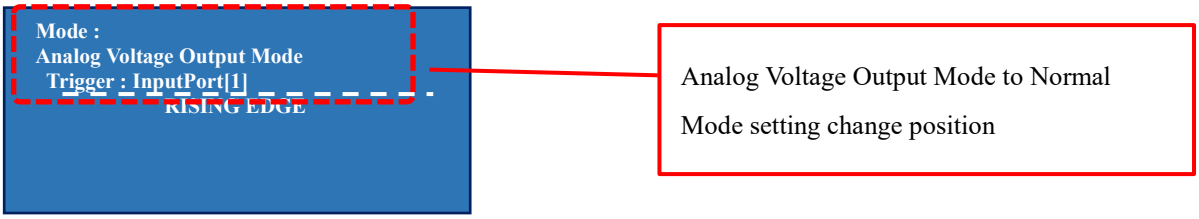
Press the MENU key to move to mode selection and trigger setting in "Analog Voltage Output Mode".

(2) Mode selection and trigger setting in "Analog Voltage Output Mode"

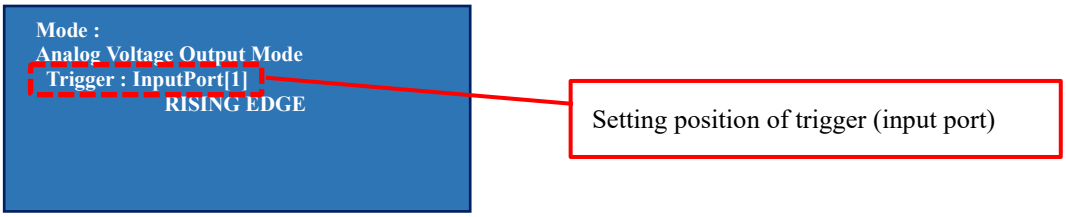


●Pressing the → key once in mode selection and trigger setting moves the cursor to "Mode :" selection.

To change the setting from Analog Voltage Output Mode to Normal Mode, use the ↑ and ↓ keys to change the setting, and press the SET key to confirm the change.



●Press the → key twice in "Mode Selection/Trigger Setting" to move the cursor to [ ] in "Trigger : InputPort[1]". Use the ↑ and ↓ keys to make changes as necessary, and press SET to confirm the setting.

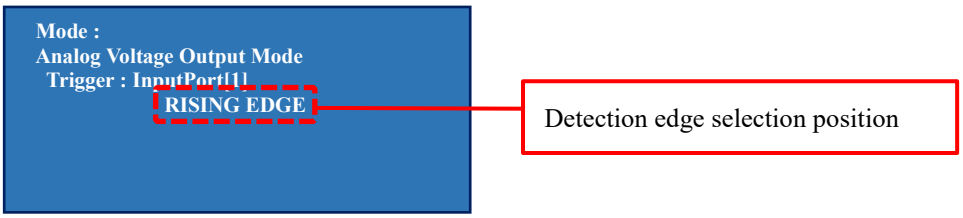


※There are 10 trigger (input) ports, and the default is 1.
Input the mold close signal with no load at the start of measurement.
Refer to P.12 1-5-3. "Connecting Input Signals" for the detailed connection procedure.

DSUB25 connector pin connection (input-port only)

Terminal No.	Signal name	Mark tube Notation	Terminal No.	Signal name	Mark tube Notation
1	GND(1～5)	GI_1-5	7	GND(6～10)	GI_6-10
2	Input port 1 (Default⇒Trigger)	IN1	8	Input port 6	IN6
3	Input port 2	IN2	9	Input port 7	IN7
4	Input port 3	IN3	10	Input port 8	IN8
5	Input port 4	IN4	11	Input port 9	IN9
6	Input port 5	IN5	12	Input port 10	IN10

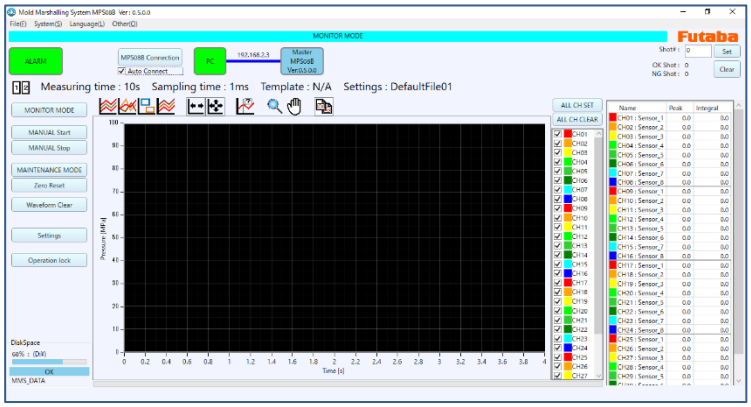
●Press the → key three times in "Mode Selection/Trigger Setting" to move the cursor to "Detect Edge" selection. Select according to the specification of the input signal from the molding machine.
Use the ↑ and ↓ keys to make changes as necessary, and press SET to confirm the setting.



RISING EDGE : Starting measurement when the trigger signal turns from OFF to ON.

4.Setting of measurement software

When the measurement software (PPSB) is started, the main operation screen is displayed.



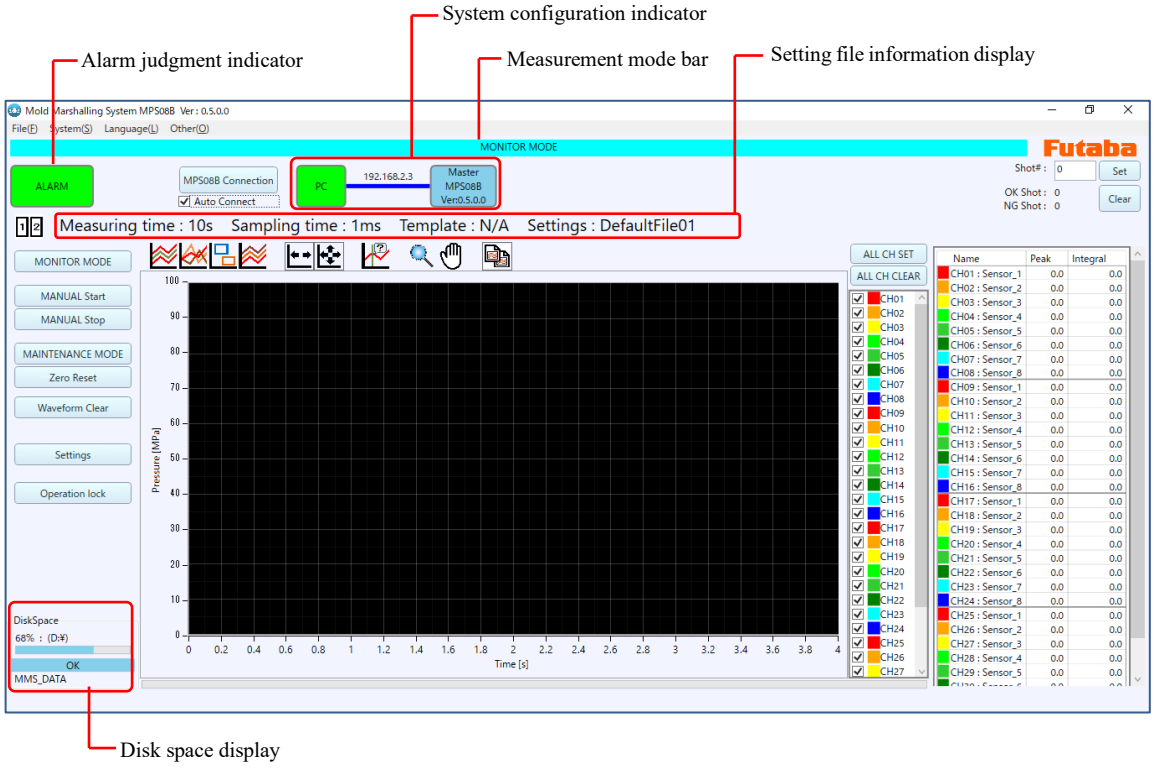
●Sections 4-1., 4-2., and 4-3. are the descriptions for the basic items of software.

●Main conditions required for pressure measurement monitoring (measurement time, sensor sensitivity, I/O signal specifications, alarm monitoring conditions, etc.) are explained in "4-4. Creation and Operation of setting files" (P.40).

4-1. Names and Functions of Screen

The outline of each display is shown below.

4-1-1. Information display area



(1)Measurement mode bar

Displays the currently selected mode.

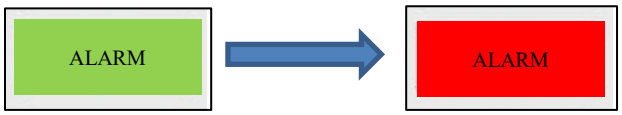
Click "Monitor Mode" or "Maintenance Mode" on the operation menu to switch.

(2)Alarm indicator

Notifies the occurrence of an alarm.

●If a value that deviates from the monitoring range occurs during measurement, an alarm signal is output immediately after the end of the corresponding shot, and the display changes to red.

・**Normal (no alarm) or abnormal (alarm)**

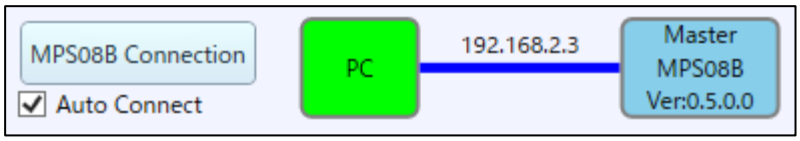


(3)System configuration indicator

Displays the currently recognized system configuration for the measurement PC (measurement software being started).

Up to four MPS08B are recognized.

●The following condition indicates that a single amplifier (MPS08B) is connected to the PC.



※Updated from the software version shown above, the current version is "Ver:1.2.0.0".

(4)Setting file information display

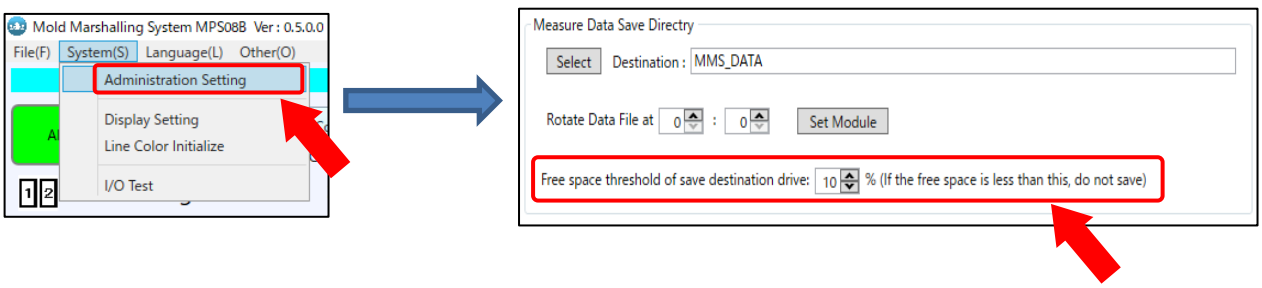
Displays the currently used setting file name, measurement time, and sampling interval.

(5)Disk space display

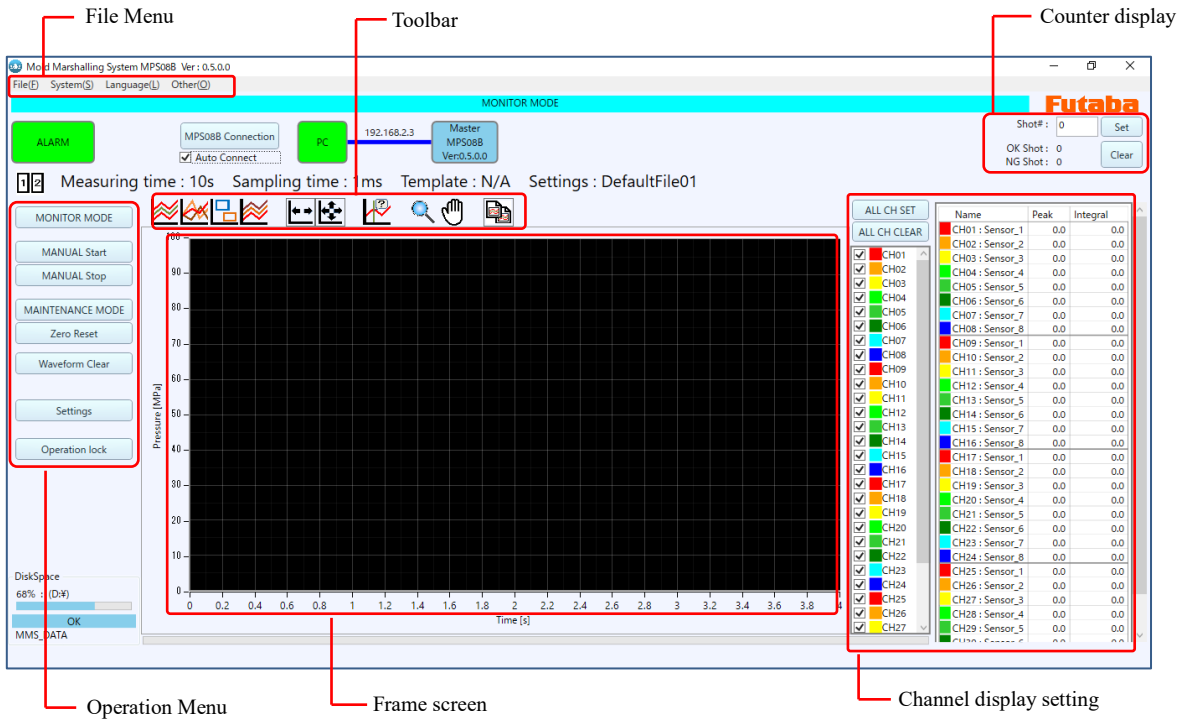
Displays the free space of the drive that is set as the storage area of the measured value.

When the free space becomes less than or equal to the set value, saving of measurement data is stopped.

●You can set the percentage of free space threshold from System ⇒Administrator Settings on the File menu.



4-1-2. Operation and setting area



(1)File Menu

Check software settings such as application operation, display settings, administrator settings, and version information.

(2)Operation Menu

Switching modes and setting buttons are arranged.

(3)Frame screen

The waveform color corresponds to the color set in the channel display setting.

(4)Counter display

Displays the total number of shots, the number of OK shots, and the number of NG shots.

●Shot number : The number from trigger signal input to measurement end is set as "1 shot", and the total number is displayed.

●Number of OK shots: If no alarm is output within one shot, it is counted as "OK shot".

●When a monitoring frame is set, if a value that deviates from the monitoring frame is measured (=an alarm is output) in the shot being measured, it is counted as an "NG shot".

(5)Channel display setting

The sensors assigned to the connected MPS08B are displayed in a list. For the connected sensor, the measured information is displayed. Display the waveform of the color shown on the left of the check box in the frame screen.

4-2. Switching languages

The "Language" in the File menu,

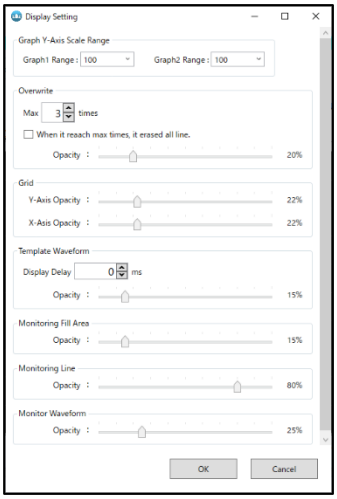
it can be switched to English, Japanese, Korean, Simplified Chinese,

or Traditional Chinese.

(As of Jul. 2023)

4-3. Initial setting of software

From "System" in the File menu, you can set the destination for saving measurement data, frame screen display settings, and the number of times waveforms overwrite.



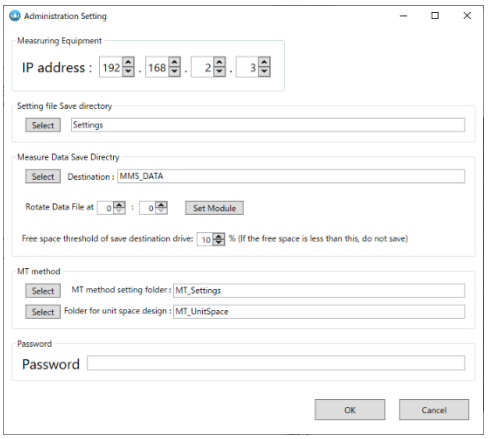
4-3-1. Display setting

Set how the measurement waveform is displayed.

Pressure display	Graph Y-axis scale	Set the vertical axis (pressure) display range of the frame screen. Select from 5 types of 25/50/100/200/400MPa or set from direct input. If the measured waveform is displayed in one window, use Graph1Range to set the Y-axis scale. Set both Graph1Range,Graph2Range for 2-screen display. Press the button in the figure below on the main screen for 2-screen display. 
Overwriting	Maximum number	Set the maximum number of measurement waveforms to be displayed simultaneously in the frame screen. Set between 0 and 99.
	Erase all when the maximum number is reached	With check: Erase all waveforms when the set number of times is exceeded. No check: Erases from the old waveform in order when the setting count is exceeded.
	Opacity	Set the density of overwritten waveforms in the range of 0 to 100%.
Grid	Opacity	Set the density of grid (scale) in the range of 0 to 100%.
Template waveform	Opacity	Set the density of the template waveform in the range of 0 to 100%.
	Display delay	Shifts the time axis of the template waveform to be displayed.
Monitoring range Fill area Monitoring range line Monitoring waveform	Opacity	Set the density of the monitoring range in the range of 0 to 100%.

4-3-2. Administration setting

IP-address of MPS08B, the storage location of measurement and configuration files can be set.



(1)Measuring instruments

Set IP address when connecting MPS08B for the first time.

If it is already set, do not change it unless it is necessary.

(2)Saving location of the setting file

By default, "Settings" is specified as the location where the setting files are saved.

When changing, please set from "Selection".

(3) Saving location of measurement data

MMS_DATA is specified by default.

When changing, please set from "Selection".

□ Rotation time

Set the time to start creating folders and log files.

Used when the operational date switching is set differently from the actual date switching.

□ Free space threshold of the destination drive

Measurement data is not saved when the capacity falls below the set value.

●For more information on stored data, refer "6. Saving and Managing Data" (P.62).

(4)MT method

You can change the location of the MT method settings folder and the folder for unit space design.

"MT_Settings" and "MT_UnitSpace" are set by default.

When changing, please set "from selection".

(5)Password

This function allows the administrator to apply an operation lock (read-only setting) to prevent the user from changing the measurement settings.

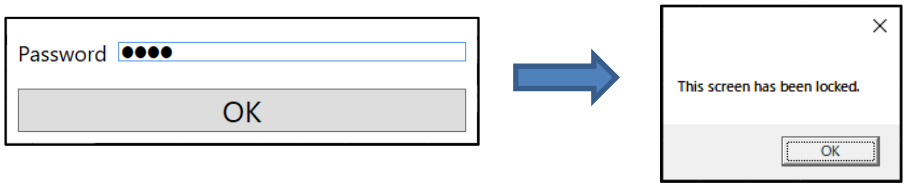
Set a password if necessary.

●Although the password can be checked at any time on the administrator screen, it is recommended that the password be recorded in case the password is forgotten while the operation is locked.

① Make read-only with a password

Enter the password set in the Main Operation Screen ⇒ Operation Menu ⇒ "Read-Only Settings".

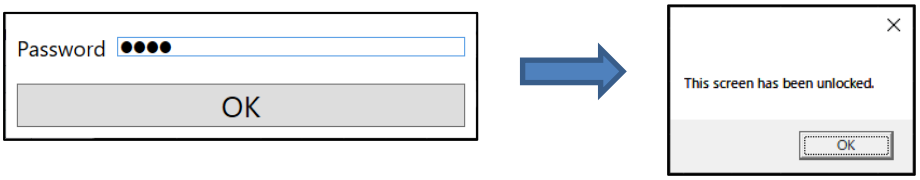
The display changes from "Read Only Setting" to "Release Read Only Setting", and the screen operation is disabled.



② Unlocking Operation with Password

Press "Release read-only setting" and enter the password set.

The operation lock is released and the display changes to the Read Only setting display again.



●The "Operation Lock" or "Operation Unlock" function can be activated even when no password is set. In this case, press "OK" without entering the password.

4-3-3. Line color initialization

Return the color of the pressure waveform changed in the main screen channel display setting to the initial color.

4-4. Creation and Operation of setting Files

<Important> Be sure to read it.

4-4-1. Operation of the setting file

All conditions required for pressure measurement monitoring can be stored and managed in a single file at once. Normally, they are managed by mold (by product). However, when the alarm monitoring zone is changed depending on the season (summer, winter, etc.), multiple setting files may be created and managed using a single mold. Please devise the name of the setting file to operate.

4-4-2. Information in the setting file

The setting file contains the following four settings:

(1)Channel Settings.... Sensor Sensitivity, Channel Name

(2)Measuring condition setting... Measuring time, sampling time, pressure unit, etc.

(3)I/O signal setting: Trigger (measurement start) signal setting, alarm output signal setting, etc.

(4)Alarm monitoring setting... Alarm monitoring type, pressure upper/lower limit value of monitoring frame, time setting, etc.

4-4-3. Location of the setting file

(1)Setting file in the amplifier

100 setting files can be saved in the memory in the amplifier.

(DefaultFile_01 [Frame 1] to DefaultFile_100 [Frame 100]

●Non-volatile memory keeps the contents of the setting file in memory even after the amplifier is turned off.

●The default name setting file is saved at the factory.

●At the time of shipment, the setting file for frame 1 [01] (DefaultFile_001) is selected.

To select a different number, use the amplifier keys.

3-2. Refer to the Key Switch and Liquid Crystal Display (P.25 File Select screen).

●To exchange the setting file stored in the amplifier or to change the setting contents, use the measurement software on the PC (it is necessary to connect the amplifier to the PC).

(2)Settings file on the PC

The newly created setting file is saved in the specified folder on the PC.

●Initially, there is no setting file in the specified folder.

●The setting file save destination can be set from "System" ⇒"Administrator Settings" in the File menu.

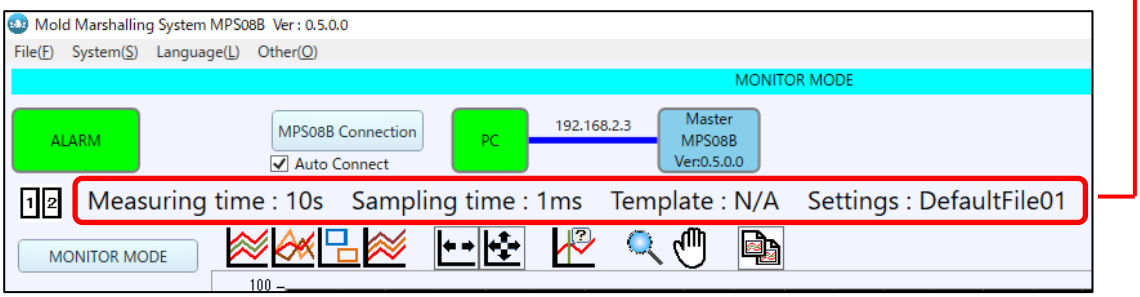
When the number of molds to be held is large, manage the setting file on the PC side.

It is convenient to sort the folders by molding machine and production location.

4-4-4. Checking the setting file selected in the amplifier

When you connect the amplifier to the PC and start the measurement software for the first time after purchase, the information in the default setting file (number [1]) stored in the amplifier will be read.

The information of the setting file currently selected by the amplifier can be checked on the measurement main screen.



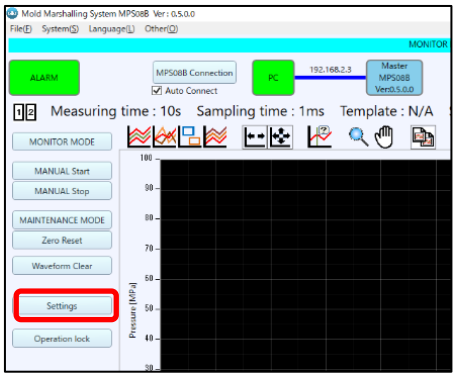
※Updated from the software version shown above, the current version is "Ver:1.2.0.0".

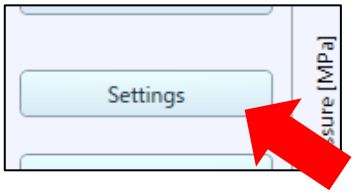
Normally, the contents of the setting file (measurement time, etc.) must be changed. Set the following items.

4-4-5. Updating the setting file

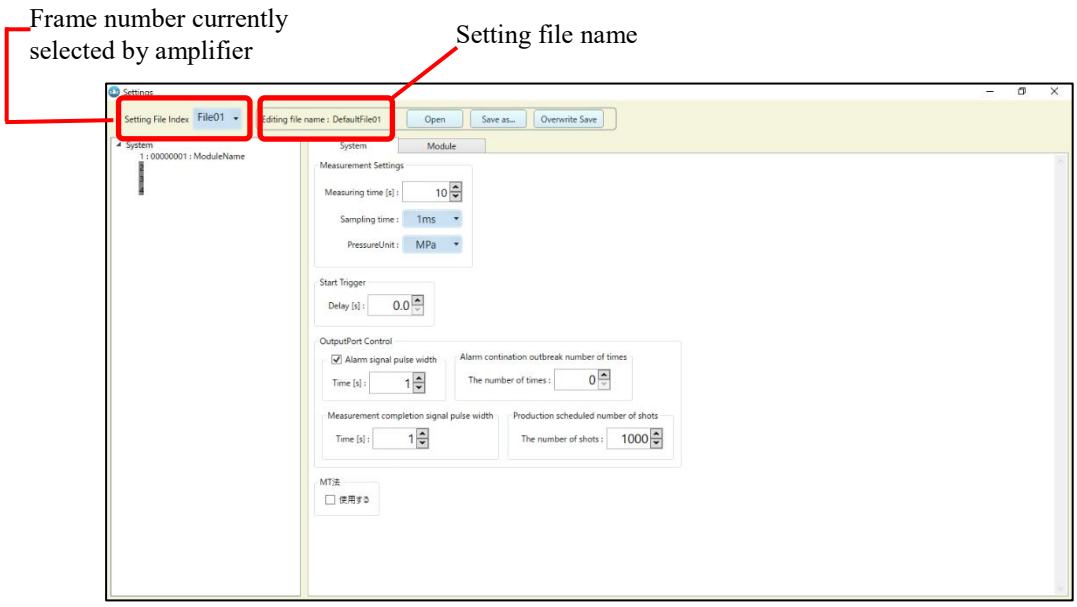
Describes how to modify and update the contents of an existing setting file.

(1) Press the “Setting” button.





The setting file information saved in the amplifier is loaded and the measurement condition setting screen is displayed.

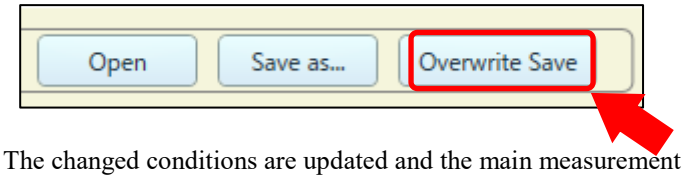


The setting file number displayed at the beginning of opening the setting screen is the frame number of the setting file selected in the amplifier. In the figure above, there is indication as File01, so you can see that the [01] frame is selected in the amplifier. The name of the selected setting file is also displayed.

(2) Change the conditions.

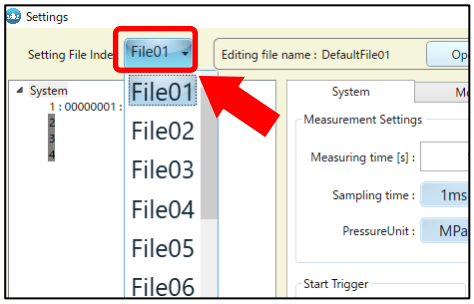
Change various conditions. Each condition setting is described in detail in Sections 4-5 to 4-8.

(3) Press Save.



The changed conditions are updated and the main measurement screen reappears.

If you would like to change the setting file for another frame number in the amplifier, pull down the frame number in "Setting File Number" and select it. Subsequent operations are the same as steps (2) and (3).



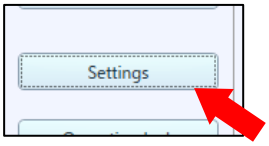
4-4-6. Creating a New setting File

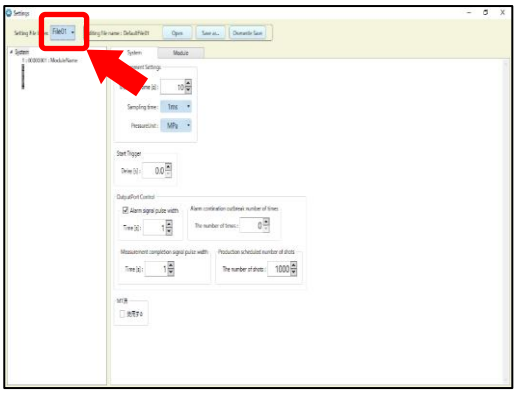
The following describes how to create a new setting file.

Follow this procedure when making measurements for the first time in a new project (mold, molded part).

This section explains how to create a new setting file "MOLD-A" and save it to the frame number [3] inside the amplifier.

(1) Press the "Settings" button.



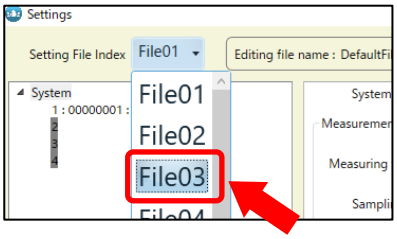


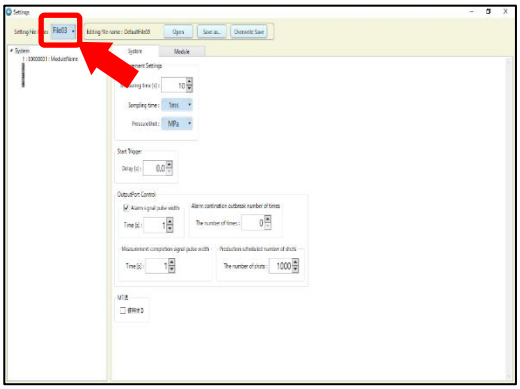
The measurement condition setting screen is displayed.

●The setting of the selected frame number in the amplifier is displayed.

(File01: Frame number [01] is displayed for the first time)

(2) Select [3] from the setting file number.



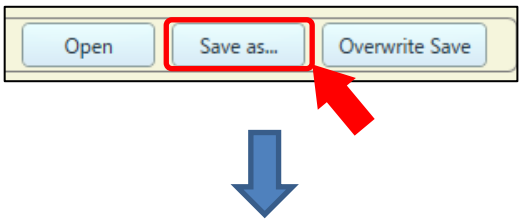


The settings in the setting file change to those of the setting file saved in File03.

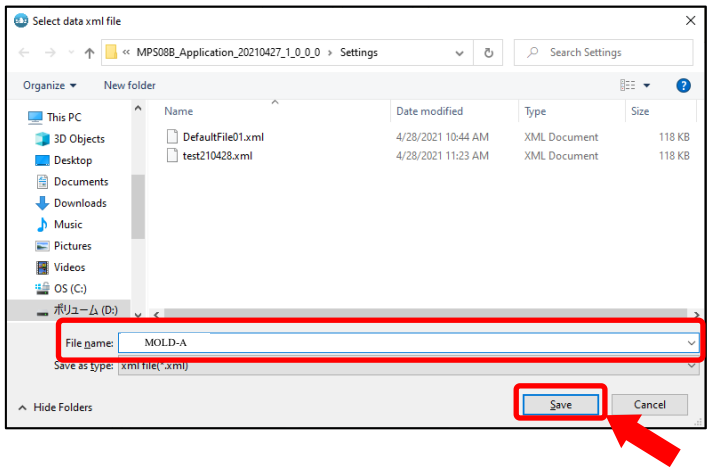
(3) The conditions are changed.

Change the conditions as necessary. Each condition setting is described in detail in Sections 4-5 to 4-8.

(4) Press "Save as".



The File Name Input window is displayed.

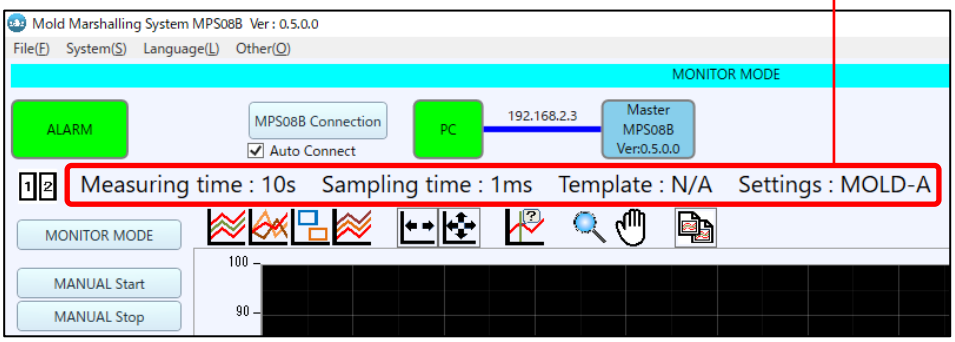


Enter "MOLD-A" for the file name and press "Save" to return to the main measurement window.

At this point, the setting file in the amplifier switches to frame number [1] □ [3],

The newly created setting file is saved.

Check whether the changed content is reflected.



※Updated from the software version shown above, the current version is "Ver:1.2.0.0".

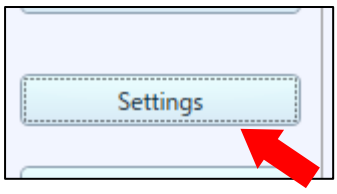
4-4-7. Switching Setting Files

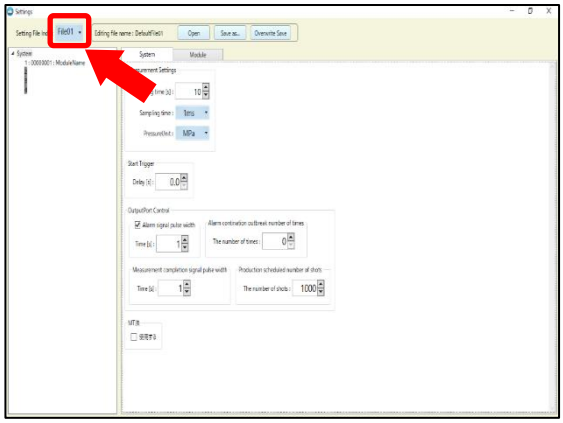
Recalls the settings file saved and managed in the PC and saves it to an arbitrary frame number of the amplifier.

This section describes the procedure for saving the settings file "MOLD-B" stored in the computer to frame number [5] in the amplifier.

●Files initially saved in frame number [5] will be overwritten. If the setting file has not been backed up in the PC, please save it as a new file and operate it.

(1) Press the Settings button.



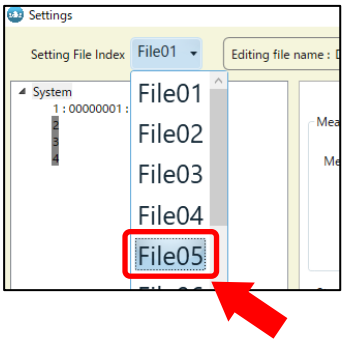


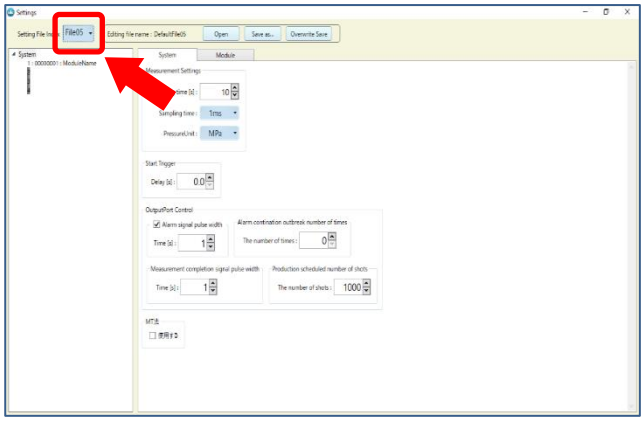
The measurement condition setting screen is displayed.

●The setting of the selected frame number in the amplifier is displayed.

(File01: Frame number [01] is displayed for the first time)

(2) Select [5] from the setting file number.

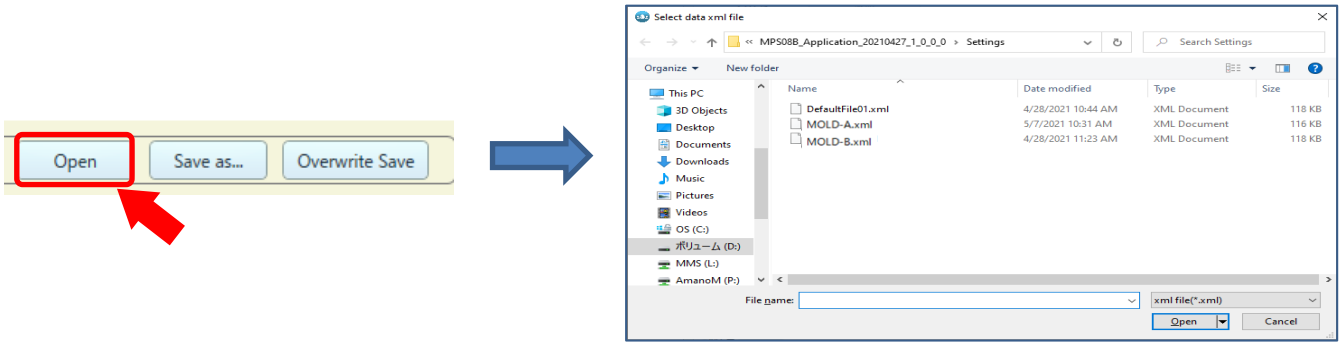




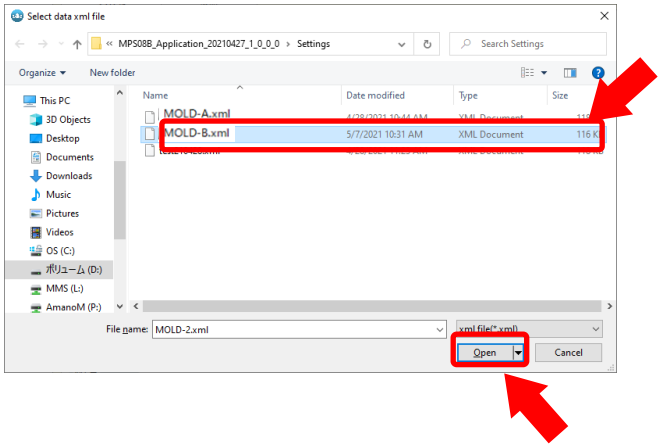
The settings in the setting file change to those of the setting file saved in File05.

(3) Open the settings files

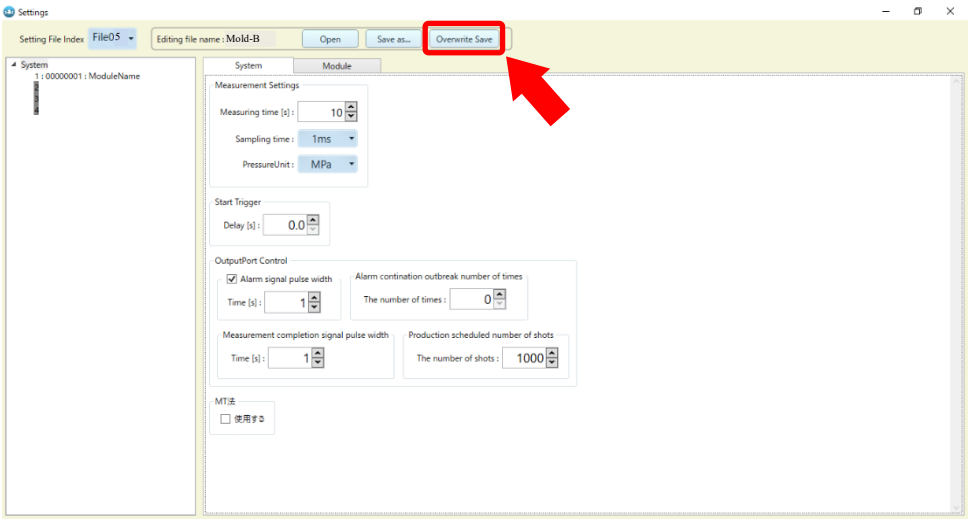
Press "Open" to open the file selection screen.



Select "MOLD-B" and press "Open" to switch to the "MOLD-B" setting.



Confirm the contents and press "Save" if there is no problem.

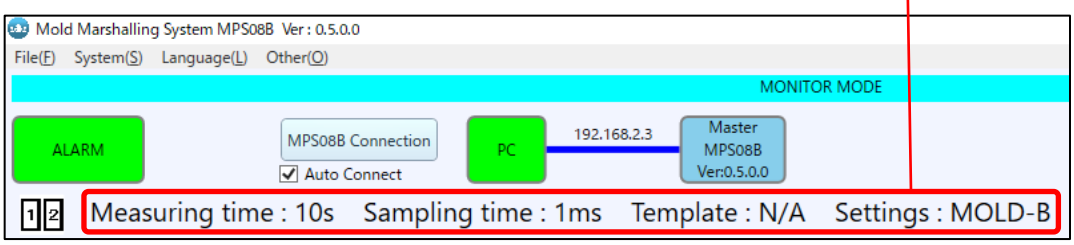


Return to the main measurement screen.

<u>At this point, the setting file in the amplifier switches to frame number [1] □ [5],</u>

<u>The setting file "MOLD-2" is stored.</u>

Check whether the changed content is reflected.



※Updated from the software version shown above, the current version is "Ver:1.2.0.0".

>>> **From here, the detailed condition setting of the setting file will be explained.**

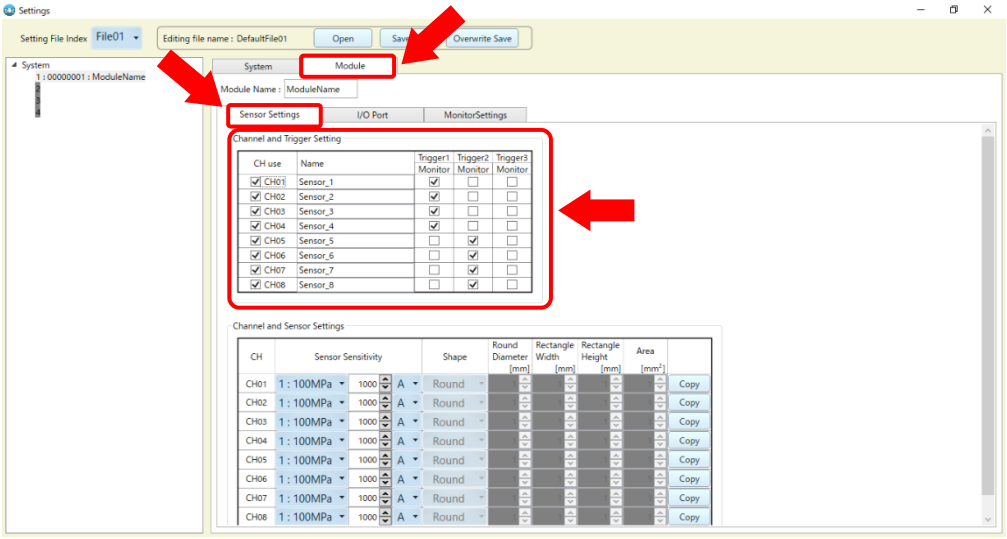
4-5. Channel Setting

Press "Settings" in the operation menu for the first time.

4-5-1. Sensor setting

(1)Channel Trigger Setting

Set each measurement channel in the Module tab □ Sensor Settings tab □ Channel and Trigger-Settings.



・Used CH : Insert ☑ into the channel to be measured. Even if a sensor is connected, the data will not be saved unless ☑ is inserted in the measurement channel.

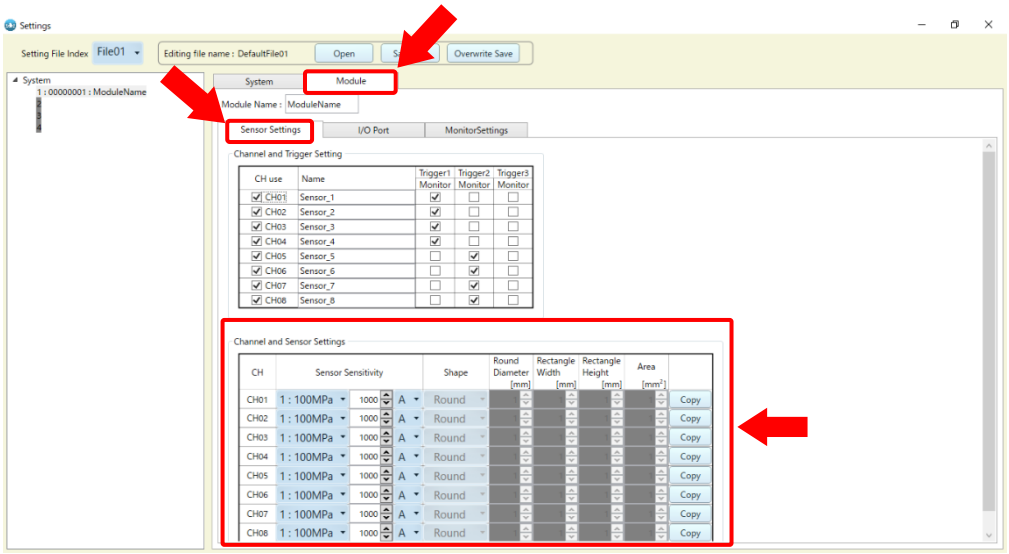
・Name : Sensor name by CH can be set. (e.g., "CAVITY 1 GATE", etc.)

・Trigger setting: A trigger can be selected for each measurement CH. (Which CH starts measurement by which trigger)

●For the horizontal molding machine, only trigger 1 should be turned ☑ because there is one type of clamping signal.

(2)Sensor sensitivity setting

Set the sensor sensitivity in the Module tab □ Sensor Settings tab □ Channel and Sensor Settings.



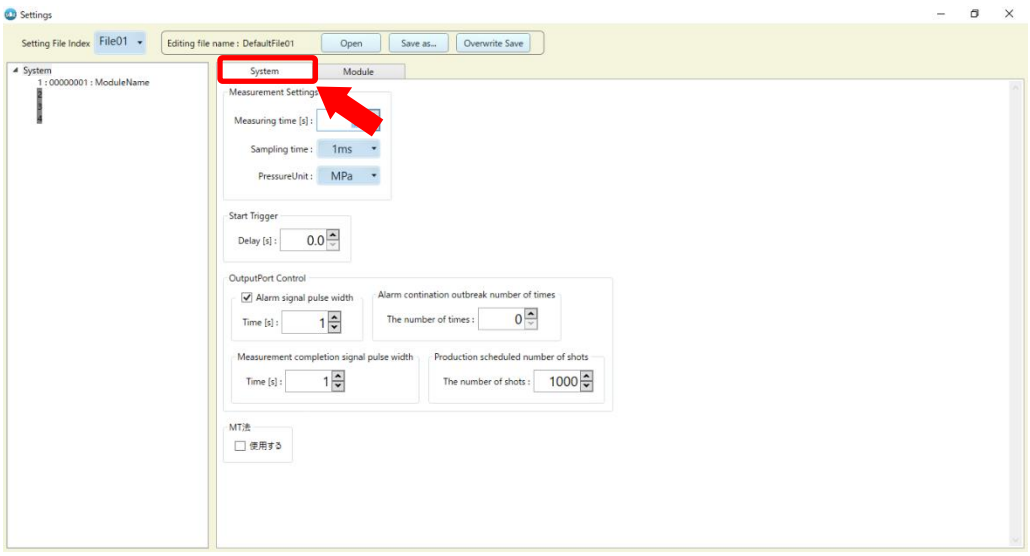
●Be sure to set the sensor sensitivity.

If the sensor sensitivity is not set or if the setting is incorrect, the pressure will not be measured correctly.

Sensor sensitivity classification	Enter the "6-digit alphanumeric characters" displayed on the sensor cable. 
Shape	It can be changed by selecting the button type sensor. Select the shape of the pressure receiving surface at the end of the ejector pin from "Round", "Rectangle" and "Area".
Diameter of a circle	When "Round shape" is selected for the pressure receiving surface shape, it can be changed. Enter the diameter of the pressure receiving surface at the end of the ejector pin.
Width Height	When "Rectangle" is selected for the pressure receiving surface shape, it can be changed. Enter the height and width of the pressure receiving surface at the end of the ejector pin.
Area	It can be changed only when "Area" is selected for the pressure receiving surface shape. Enter the cross-sectional area of the pressure receiving surface at the end of the ejector pin.

4-6. Setting the measurement conditions

Next, set the measurement conditions. Set the measurement conditions on the System tab.



4-6-1. Explanation of Terms

Measurement setting	Measurement time	It can be set from 1 to 120000 seconds in 0.01s units. (Varies depending on the sampling interval)
	Sampling interval	Can be set at 1ms, 2ms, 5ms, 10ms, 20ms, 50ms, 100ms, 200ms, 500ms, or 1000ms.
	Pressure unit	MPa, kgf/cm2, psi, bar
Start trigger	Delay	It can be set from 0.0 to 25.0 seconds in 0.1 second increments. When connecting the mold close completion signal, set it in 0.0 seconds.
External output function	Alarm pulse width	Set the alarm output time.
	Alarm continuation outbreak number of times	An alarm is output when an error exceeds the specified number of times.
	Shot End pulse width	Set the shot completion output time.
	Production scheduled number of shots	Outputs a signal when the number of production shots is reached.
MT method	Use	Select whether to use MT method.

4-7. I/O signal setting

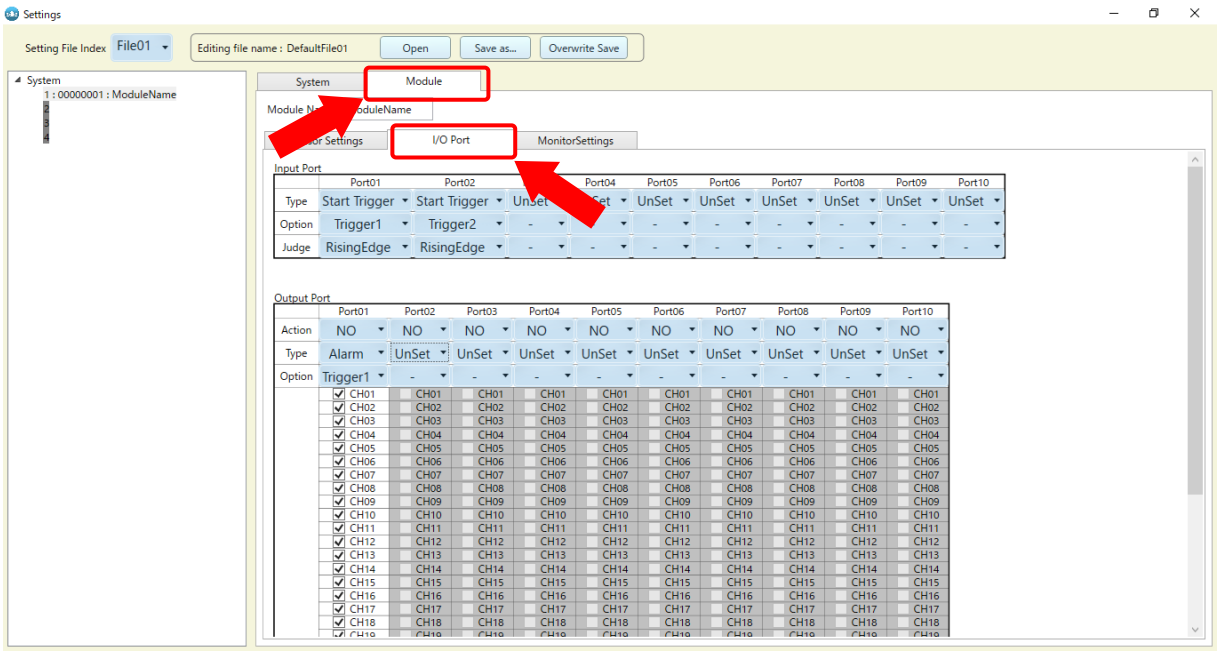
Next, set the I/O signal conditions.

There are 10 ports for each of the input and output ports. Assign these ports according to the status of use.

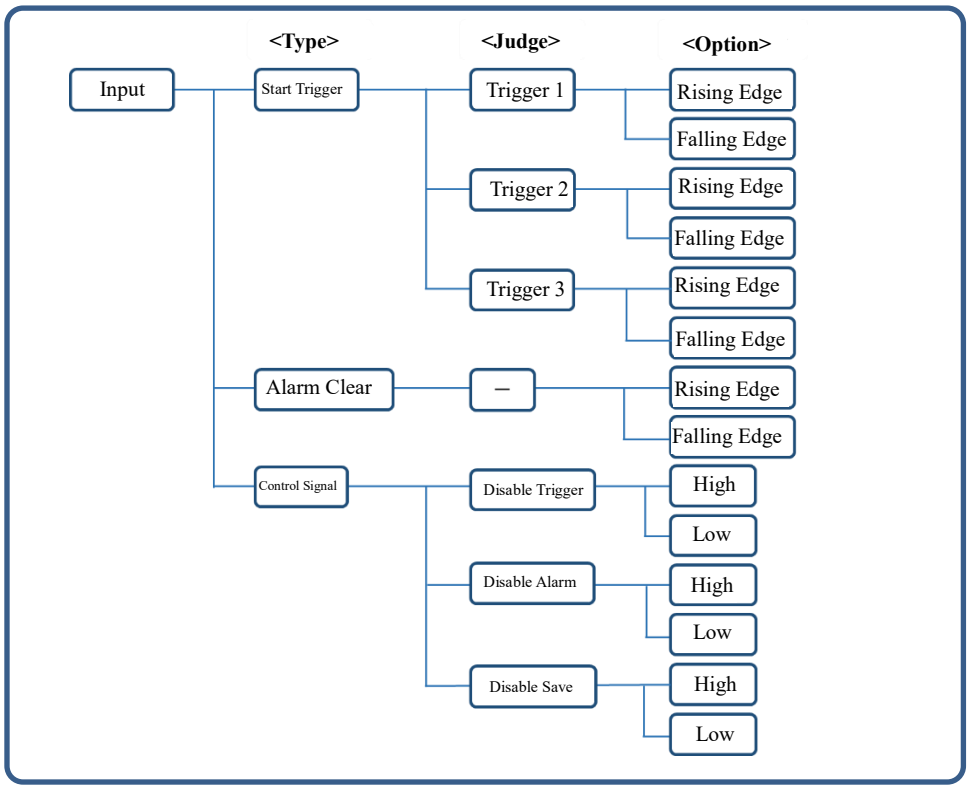
●One input signal for starting measurement must be connected.

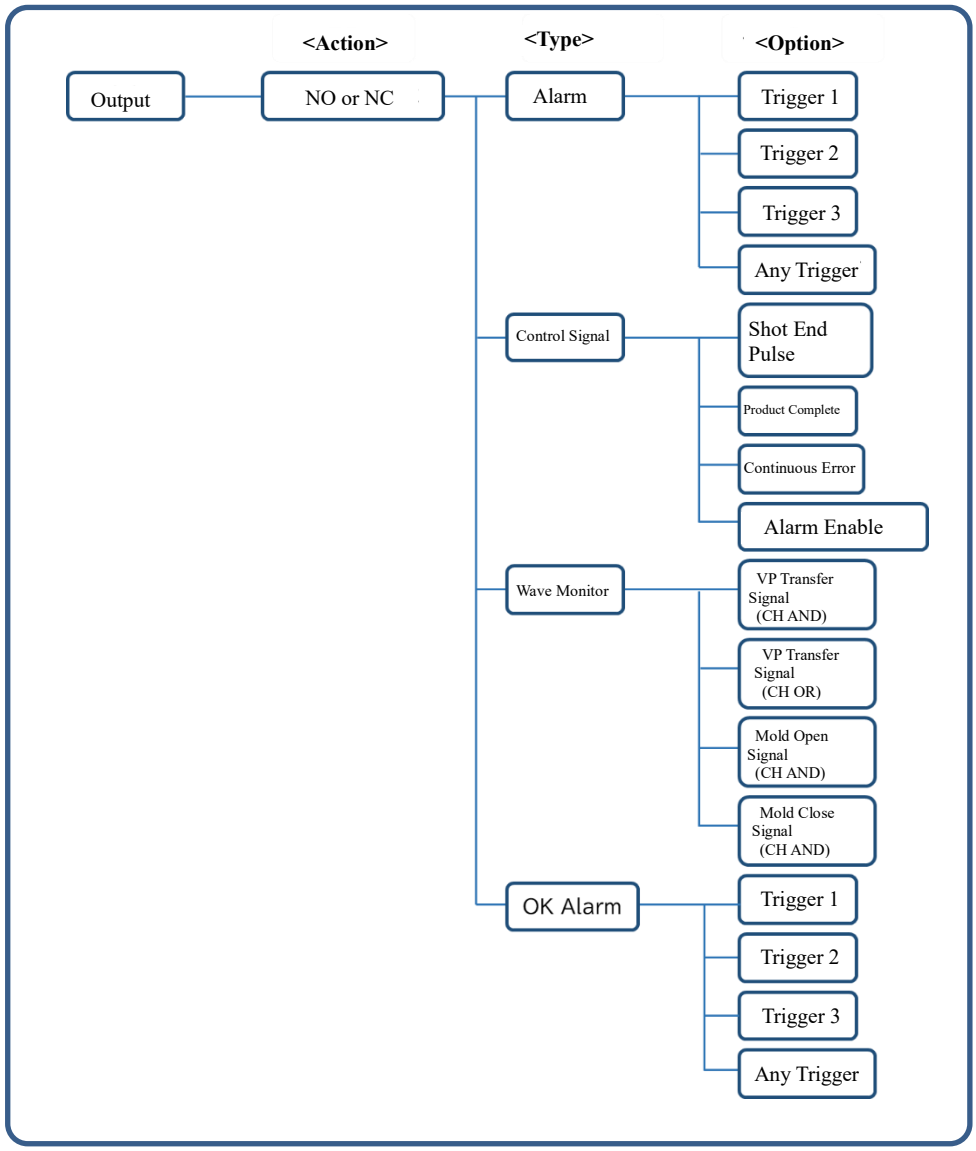
●If alarm monitoring is not performed, no connection of the output signal is required.

Set in the "Module" tab ⇒ "Input/output signal" tab.



■Hierarchy of input/output signal selection





4-7-1. Default setting

The default settings are as follows:

Input Port

	Port01	Port02	Port03	Port04	Port05	Port06	Port07	Port08	Port09	Port10
Type	Start Trigger	Alarm Clear	UnSet	UnSet	UnSet	UnSet	UnSet	UnSet	UnSet	UnSet
Option	Trigger1	-	-	-	-	-	-	-	-	-
Judge	RisingEdge	RisingEdge	-	-	-	-	-	-	-	-

Output Port

	Port01	Port02	Port03	Port04	Port05	Port06	Port07	Port08	Port09	Port10
Action	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Type	Alarm	UnSet	UnSet	UnSet	UnSet	UnSet	UnSet	UnSet	UnSet	UnSet
Option	Trigger1	-	-	-	-	-	-	-	-	-
	☑ CH01	☐ CH01	☐ CH01	☐ CH01	☐ CH01	☐ CH01	☐ CH01	☐ CH01	☐ CH01	☐ CH01
	☑ CH02	☐ CH02	☐ CH02	☐ CH02	☐ CH02	☐ CH02	☐ CH02	☐ CH02	☐ CH02	☐ CH02
	☑ CH03	☐ CH03	☐ CH03	☐ CH03	☐ CH03	☐ CH03	☐ CH03	☐ CH03	☐ CH03	☐ CH03
	☑ CH04	☐ CH04	☐ CH04	☐ CH04	☐ CH04	☐ CH04	☐ CH04	☐ CH04	☐ CH04	☐ CH04
	☑ CH05	☐ CH05	☐ CH05	☐ CH05	☐ CH05	☐ CH05	☐ CH05	☐ CH05	☐ CH05	☐ CH05
	☑ CH06	☐ CH06	☐ CH06	☐ CH06	☐ CH06	☐ CH06	☐ CH06	☐ CH06	☐ CH06	☐ CH06
	☑ CH07	☐ CH07	☐ CH07	☐ CH07	☐ CH07	☐ CH07	☐ CH07	☐ CH07	☐ CH07	☐ CH07
	☑ CH08	☐ CH08	☐ CH08	☐ CH08	☐ CH08	☐ CH08	☐ CH08	☐ CH08	☐ CH08	☐ CH08
	☑ CH09	☐ CH09	☐ CH09	☐ CH09	☐ CH09	☐ CH09	☐ CH09	☐ CH09	☐ CH09	☐ CH09
	☑ CH10	☐ CH10	☐ CH10	☐ CH10	☐ CH10	☐ CH10	☐ CH10	☐ CH10	☐ CH10	☐ CH10
	☑ CH11	☐ CH11	☐ CH11	☐ CH11	☐ CH11	☐ CH11	☐ CH11	☐ CH11	☐ CH11	☐ CH11
	☑ CH12	☐ CH12	☐ CH12	☐ CH12	☐ CH12	☐ CH12	☐ CH12	☐ CH12	☐ CH12	☐ CH12
	☑ CH13	☐ CH13	☐ CH13	☐ CH13	☐ CH13	☐ CH13	☐ CH13	☐ CH13	☐ CH13	☐ CH13

4-7-2. Typical I/O Signal Settings

(1) Setting example 1: When the horizontal molding machine alarm is not monitored, a measurement trigger (mold close completed) is output.

Eight-point measurement/trigger 1 was used.

Start trigger is assigned to input port 1.

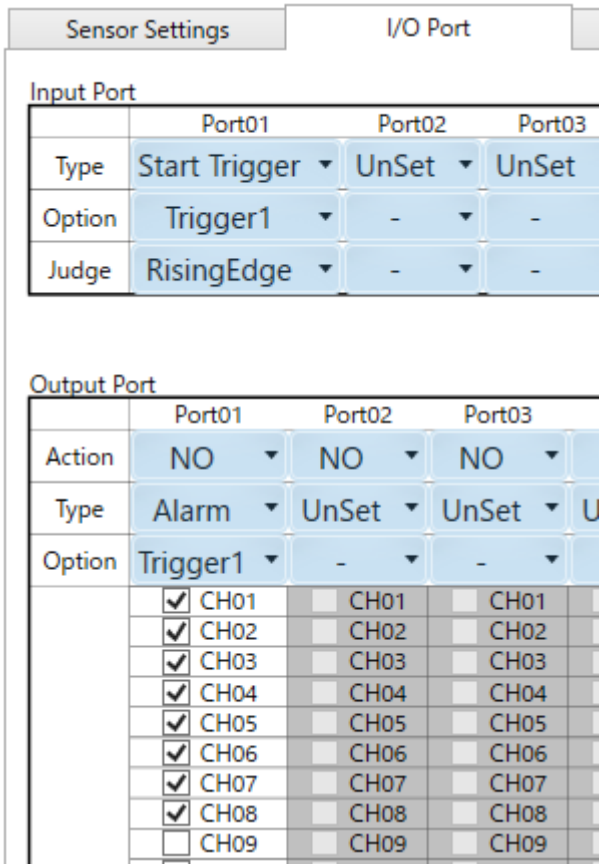
① Sensor setting

Sensor Settings | I/O Port | MonitorSettings

Channel and Trigger Setting

CH use	Name	Trigger1 Monitor	Trigger2 Monitor	Trigger3 Monitor
☑ CH01	Sensor_1	☑	☐	☐
☑ CH02	Sensor_2	☑	☐	☐
☑ CH03	Sensor_3	☑	☐	☐
☑ CH04	Sensor_4	☑	☐	☐
☑ CH05	Sensor_5	☑	☐	☐
☑ CH06	Sensor_6	☑	☐	☐
☑ CH07	Sensor_7	☑	☐	☐
☑ CH08	Sensor_8	☑	☐	☐

② I/O signal setting



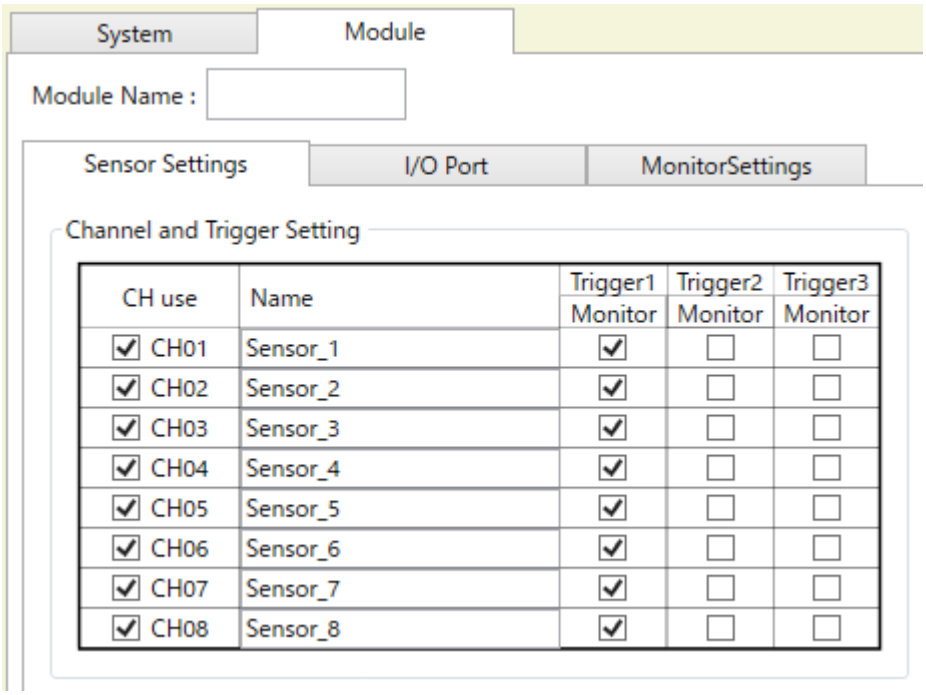
(2) Setting example 2: Horizontal molding machine alarm monitoring Measurement trigger (mold close completed)

Eight-point measurement/trigger 1 was used.

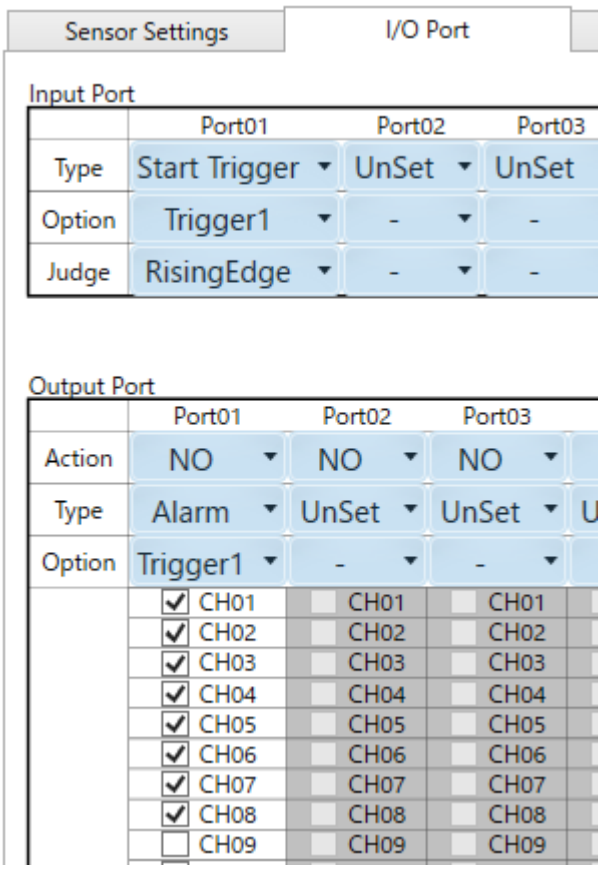
Start trigger is assigned to input port 1.

An alarm was assigned to output port 1.

① Sensor setting



② I/O signal setting



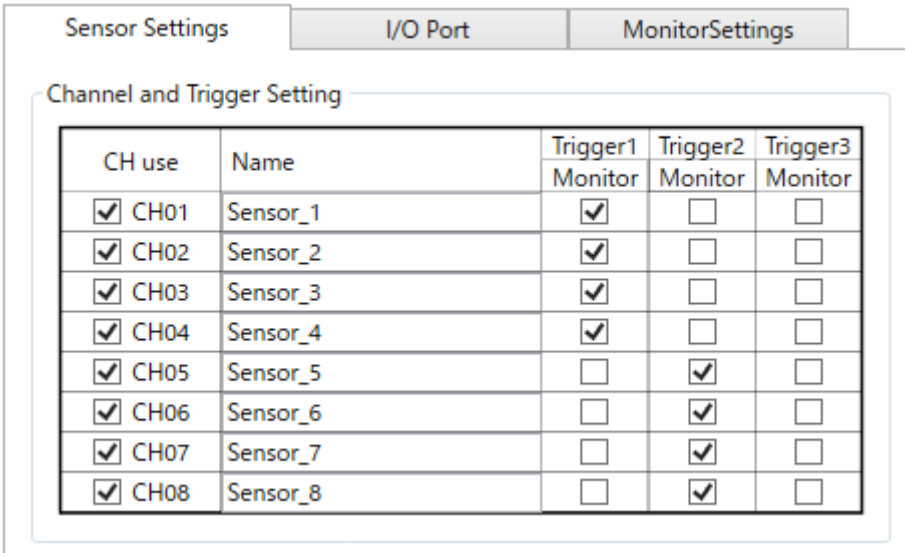
(3) Setting example 3: Measurement trigger when rotary molding alarm monitoring is not performed (mold close completed)

Surface A 1 to 4ch trigger 1 was used.

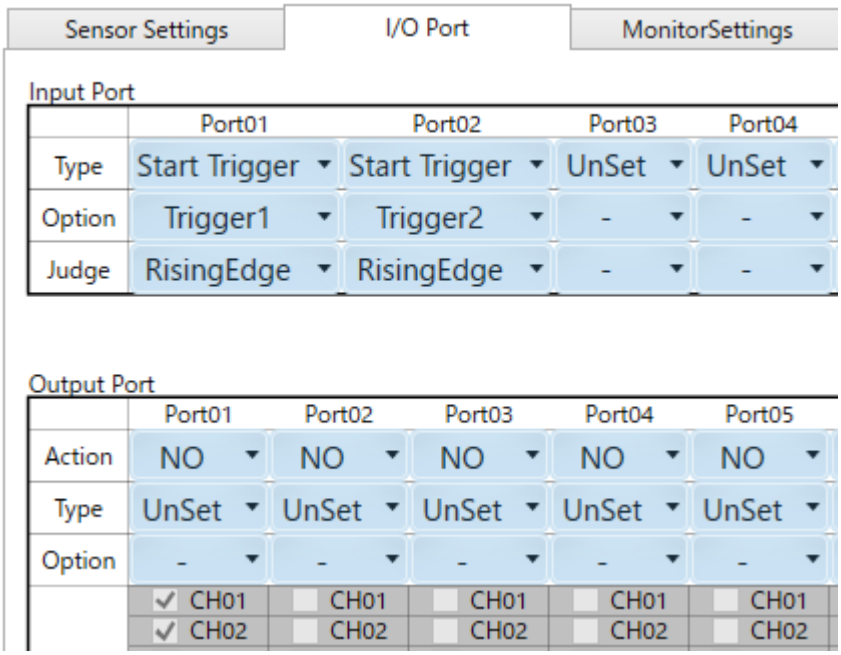
Surface B 5 to 8ch trigger 2 was used.

Start trigger (trigger 1) is assigned to input port 1 and start trigger (trigger 2) is assigned to input port 2.

① Sensor setting



② I/O signal setting



(4) Setting example 4: Measurement trigger for monitoring rotary molding alarm (mold close completed)

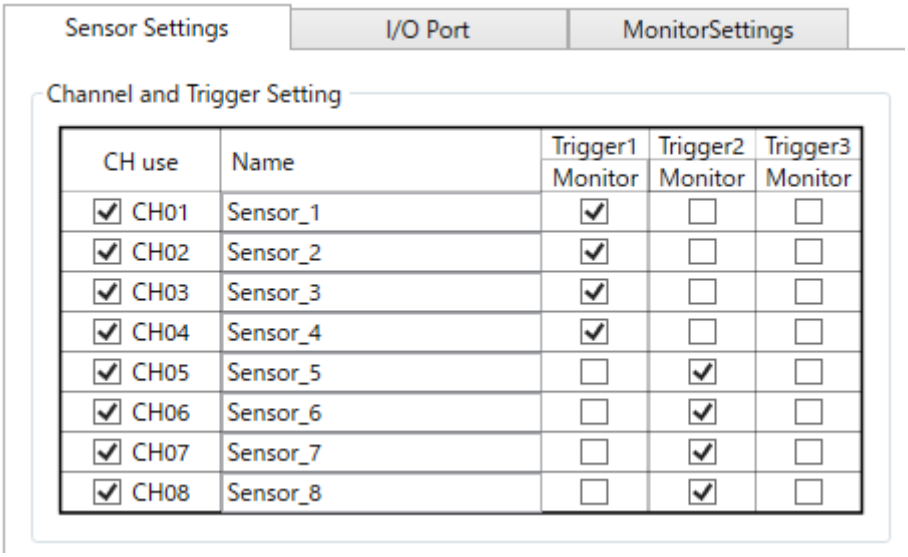
Surface A 1 to 4ch trigger 1 was used.

Surface B 5 to 8ch trigger 2 was used.

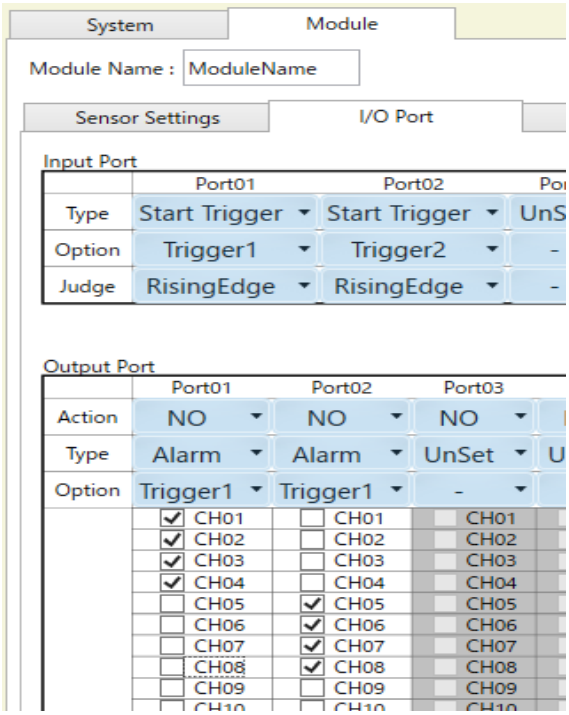
Start trigger (trigger 1) is assigned to input port 1 and start trigger (trigger 2) is assigned to input port 2.

Alarm (trigger 1) was assigned to output port 1, and alarm (trigger 2) was assigned to output port 2.

① Sensor setting



② I/O signal setting



4-7-3. Explanation of Terms

This section describes the terms for input and output signals.

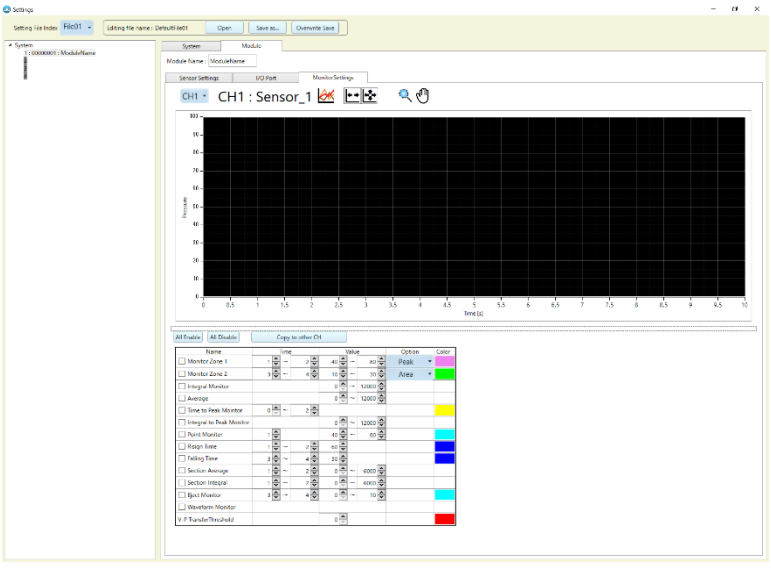
Input	**Signal name**	**Start trigger**	**Sets the measurement start trigger.**
	Option	Trigger (1～3)	Specify the trigger number to be used.
	Detected edge	Rising edge Falling edge	This can be selected according to the specifications of the input signal from the molding machine. Rising edge: Starting measurement when the signal changes from OFF to ON Falling edge: Starting measurement when the signal changes from ON to OFF
	Signal name	**Alarm clear**	**Check this box to clear the alarm by an external signal.**
	Detected edge	Rising edge Falling edge	Select according to the specifications of the input signal from the machine. Rising edge: Operation starts when the signal changes from OFF to ON Falling edge: Operation starts when the signal changes from ON to OFF
	Signal name	**Control signal**	**The following functions are disabled by external signals.**
	Option	Disabled trigger Disabled alarm Disabled save	Disables the trigger. Disables the alarm. Disables saving of waveform data.
	Detected edge	Rising edge Falling edge	Rising edge: Operation starts when the signal changes from OFF to ON Falling edge: Operation starts when the signal changes from ON to OFF

Output	**Operation**	NO NC	NO: Operation is started when a signal changes from OFF to ON NC: Operation is started when a signal changes from ON to OFF
	Signal name	**Alarm**	**Outputs an alarm signal.**
	Option	Trigger (1～3)	Specify the trigger number to be used.
	Signal name	**Control signal**	**Outputs various control signals.**
	Option	Shot end pulse Product complete Continuous error Alarm enable	Outputs a signal when the shot is complete. When the specified number of shots (OK shots) is reached, the signal is outputted. Outputs a signal when the specified number of alarms occurs continuously. Outputs a signal when the alarm is enabled
	Signal name	**Wave monitor**	**Outputs various waveform monitoring signals.**
	Option	VP transfer signal (CH_AND) VP transfer signal (CH_OR) Mold open signal (CH_AND) Mold open signal (CH_OR)	When all the selected CH exceed the thresholds, the signal is outputted. If at least one of the selected CH exceeds the threshold. Outputs a signal. When all the selected CH are below the thresholds, they are output. If at least one of the selected CH falls below the thresholds, a signal is output.
	Signal name	**OK ALARM**	**Outputs an alarm (non-defective) signal when the condition is within the monitoring condition.**
	Option	Trigger (1～3)	Specify the trigger number to be used.

4-8. Alarm monitoring condition setting

Set the following settings only when using the alarm setting.

For more information on the monitoring modes, see "8-1. Supplemental Materials for Alarm Monitoring Frame Settings" (P.75).



4-8-1. Explanation of Terms

This section describes the terms for alarm monitoring.

Monitoring zone 1/Monitoring zone 2	The monitoring zone is set according to the desired time and value, and the measured value is monitored to see if it is within the zone. Peak: Whether the maximum pressure value within the monitoring time within the monitoring pressure value. Area: Whether the entire waveform within the monitoring time within the monitored pressure value.
Integral monitor	Monitors whether the integral value (pressure waveform and area enclosed in the time axis) within the measurement time is within the set range.
Average	Calculates the average value of all measurements within the measurement time and monitors whether it is within the set range.
Time to peak monitor	Monitors whether a maximum pressure value (peak pressure value) occurs within the monitoring time.
Integral peak monitor	Monitors whether the integral value up to the maximum pressure value (peak pressure value) within the measurement time is within the set integral value range.
Point monitor	Monitors whether the pressure value at the set time (t seconds) has elapsed is within the set range.
Rising	Monitors the moment when the measured value rises to the set value within the set time.
Falling	Monitors the moment when the measured value drops to the set value within the set time.
Section average	Monitors whether the average value in the monitoring time is within the set range.
Section integral 1 Section integral 2	Monitors whether the integral value (area enclosed by the pressure waveform and time axis) within the monitoring time is within the set range.
Eject monitoring	Set the monitoring zone for the pressure applied during the post-molding ejection and monitor whether the peak pressure value and the occurrence time are within the monitoring zone.
Waveform monitor	When this check box is selected, the template waveform and its allowable amplitude (upper and lower limits) settings are applied to monitor whether the entire area of the measured waveform is within that amplitude. A monitoring waveform must be created and transmitted to the measuring instrument in advance.
V-P transfer threshold	A control signal is outputted at the moment when the measured value reaches V-P transfer threshold.

※To cancel the alarm, disable the monitoring zone from the monitoring condition setting or disable CH from the measuring screen.

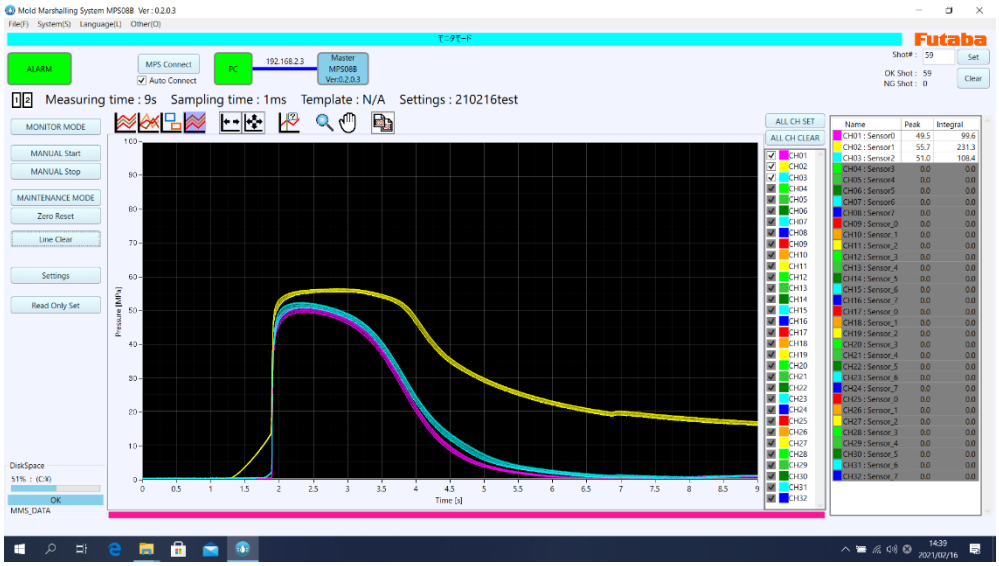
※Measurement can also be performed without setting the monitoring zone. In this case, the log file of the measurement result is displayed as "-".

5.Start measurement

When the setting is completed, measurement starts.

5-1. Starting Measurement (Monitor Mode)

When molding starts and a trigger signal (mold close completed, etc.) is input, pressure measurement starts, and the waveform is displayed on the screen.



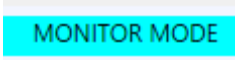
●If no trigger signal is connected, the measurement does not start even if the molding is started.

Manual start can be performed with the "SET" key on MPS08B panel. Use this key as required.

●When the wave form is not displayed, refer to "10. Troubleshooting" (P.104).

5-1-1. Select the measurement mode

Check that the measurement mode bar at the top of the screen is set to "Monitor mode". When the unit is set to monitor mode, it is in standby mode waiting for a trigger signal (measurement start signal) from the molding machine.



●The mode at startup is Monitor mode.

●When in "Maintenance mode", click "Monitor mode" in the operation menu.

5-1-2. Select the setting file

When the measurement software PPSB is started, the settings are automatically loaded from the connected amplifier.

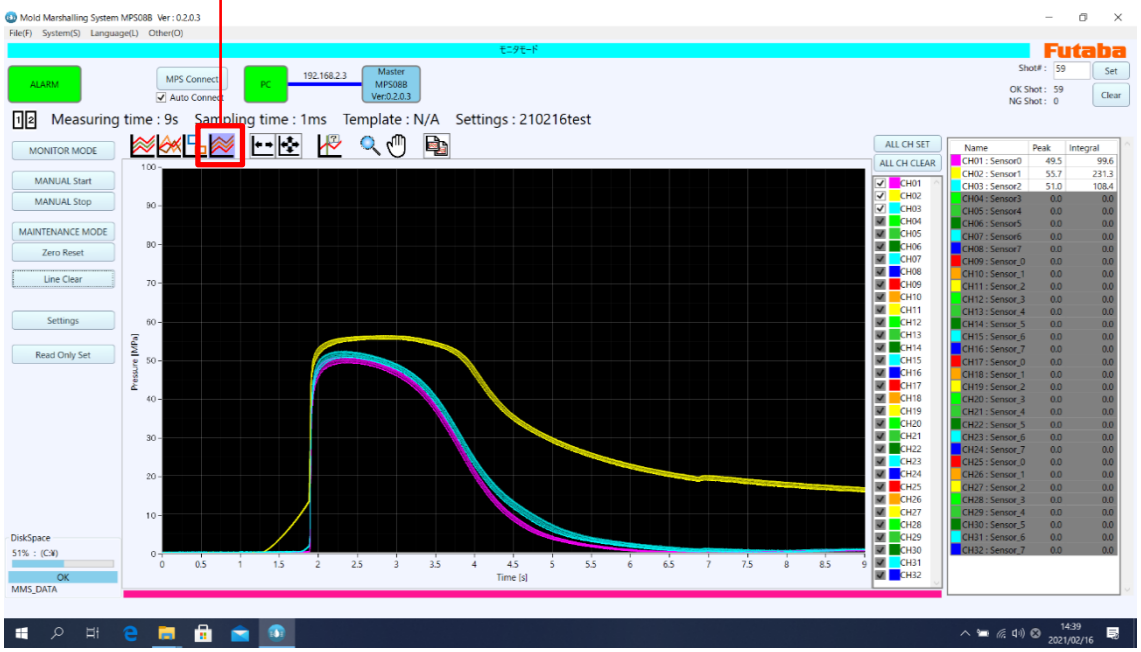
To start measurement in this state, no setting is necessary.

●If the setting file needs to be changed, refer to "4-4. Creating and Operating a Setting File" (P.40) and set the setting.

5-2. Overwrite the waveform for each shot

The measured waveform can be overwritten and displayed.

Turn on the Overwrite Show/Hide icon.



●The number of overwrite can be set in "4.3 Initial setting of software " (P.38).

5-3. Compare and display with the template waveform

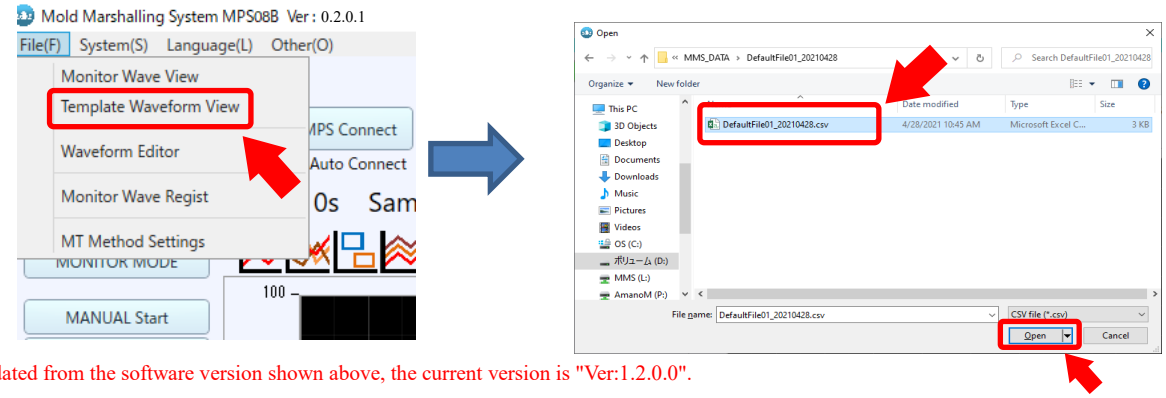
Pressure waveforms saved in the past are displayed on the screen as "Template Waveform" and can be compared with the waveform being measured.

For "waveform matching of molding conditions," "pressure fluctuation during mass production," and "pressure change when molding conditions are changed," it can be visually and in real time.

5-3-1. Load template waveform

From the File menu, click Display Template Waveform.

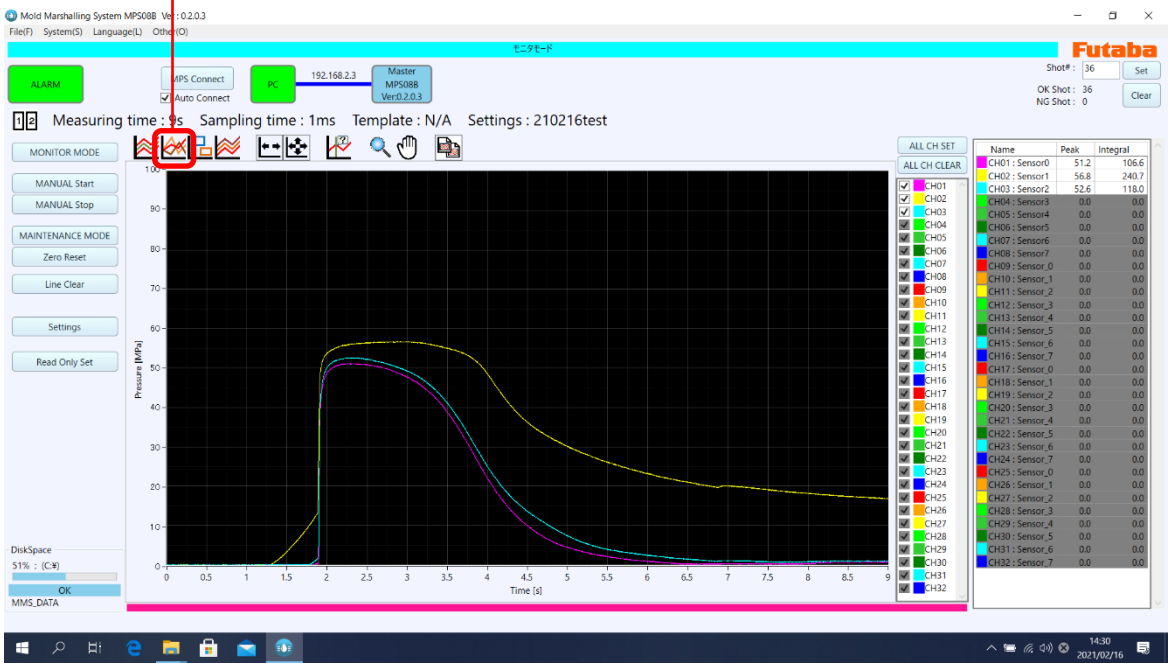
In the file selection window, select the waveform file and press "Open".



※Updated from the software version shown above, the current version is "Ver:1.2.0.0".

The template waveform is displayed on the measurement screen.

Turn on the template waveform display/hide icon.



●The density of the displayed template waveform can be set.

「4-3. See "Initial setting of software (Display Setting)" (P.38).

5-4. Basic Waveform Display Operations

The display method of the measured waveform data can be changed.

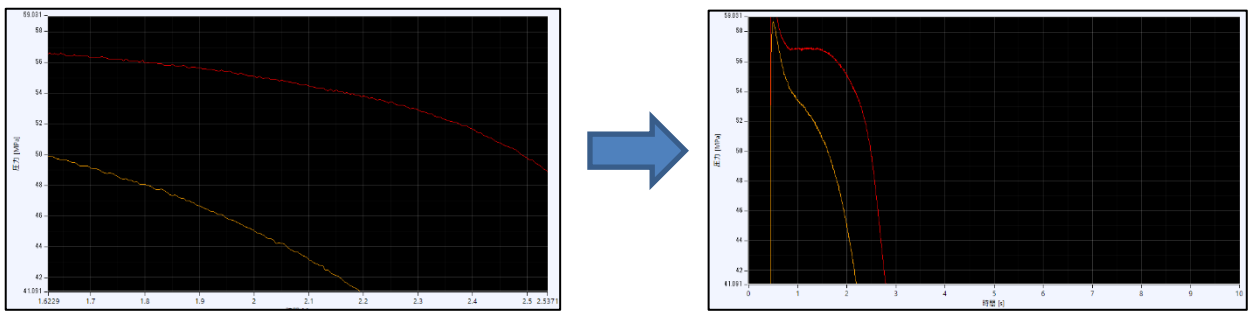
5-4-1. The toolbar

Commands for operating waveform display are arranged using the icon buttons.

Icon name		Operation details
	Show/Hide Monitoring Waveform	Switches whether the set monitoring waveform is displayed on the frame screen or not.
	Show/Hide Template Waveform	Switches whether the loaded template waveform is displayed on the frame screen or not.
	Show/Hide Monitoring Zone	Switches between displaying/not displaying the set monitoring zone on the frame screen.
	Show/Hide Overwrite	Toggles whether the measurement waveform overwrite waveform is displayed on the frame screen.
	Zoom Out Horizontally to Full Scale	Fits the waveform's left/right full scale (measurement time) to the frame screen when the measurement waveform is enlarged and displayed. Up and down (pressure display) remain enlarged.
	Zoom Out to Full Scale	Fits the upper and lower full scale (pressure display) and left and right full scale (measurement time) of the waveform to the frame screen when the measurement waveform is displayed in the enlarged display. The entire display without enlargement is displayed.
	Cursor Tool	Displays the pressure value at the cursor position.
	Zoom Tool	Drag in the frame screen to enlarge the selected area to fit the frame screen.
	Hand tool	Drag to move the display area.
	Save Image	Save a screen shot of PPSB.

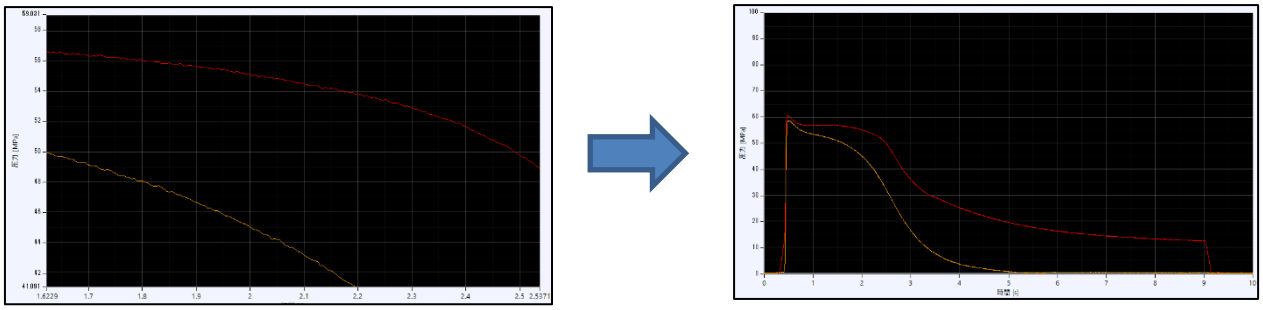
(1) Zoom Out Horizontally to Full Scale

Fits the waveform's left/right full scale (measurement time) to the frame screen when the measurement waveform is enlarged and displayed. Up and down (pressure display) remain enlarged.



(2) Zoom Out to Full Scale

Fits the upper and lower full scale (pressure display) and left and right full scale (measurement time) of the waveform to the frame screen when the measurement waveform is displayed in the enlarged display.

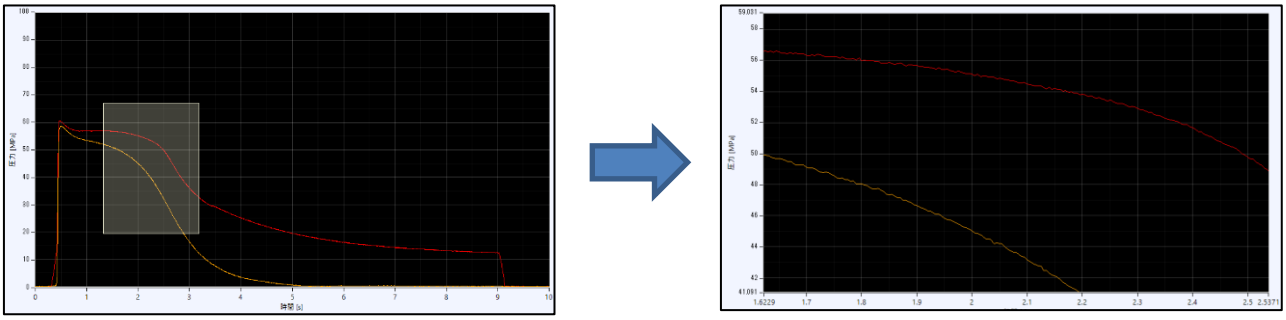


(3)Cursor tool

Displays the pressure value and the time at the cursor position.

(4)Zoom tool

Drag in the frame screen to enlarge the selected area to fit the frame screen.



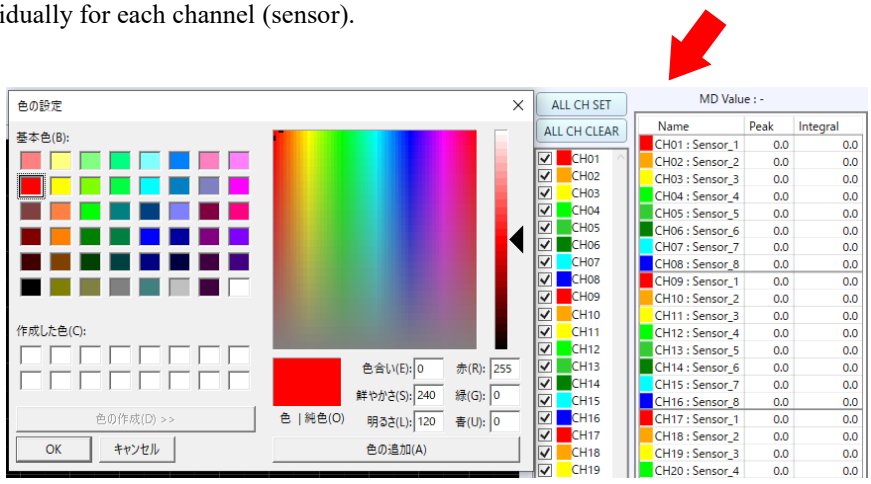
(5)Hand tool

Drag to move the display area.

(6)Waveform display color setting

Click the color box in the channel information display area and select the color desired.

Colors can be set individually for each channel (sensor).



6.Saving and Managing Data

6-1. Type of saved data

The following three types of saved data are available.

	File name	Save destination
Setting file	Files can be saved with any file name up to 16 single-byte alphanumeric characters. (Default: DefaultFile001.xml)	(exe file destination folder)/Settings folder
Measured data	・The images are saved in the order of the shot numbers. ・It can be edited with spreadsheet software. Waveform data: [Setting file name]_[yyyymmdd]_ [hhmmss]_[shot number]. csv	(exe file destination folder)/MMS_DATA/Settings file name_yyyyymmdd folder.
Log file	・It can be edited with spreadsheet software. [Setting file name]_[yyyymmdd].csv	

6-2. Saving Setting File

For details on saving the setting file, see "4-4. Creating and Operating the Setting File" (P.40).

6-3. Saving waveform data (measurement data)

The waveform is stored in CSV format.

Easy processing such as editing waveforms with commercially available spreadsheet software.

6-4. Saving historical data (log files)

The following describes the details of the saved log files.

6-4-1. List of Saved Data Items

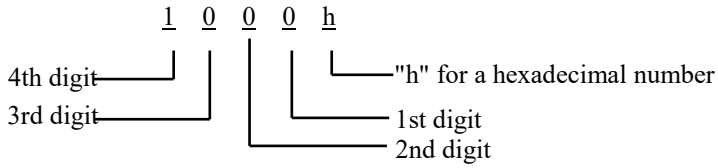
Display	Meaning
Date Time	Measurement start time
Interval	Trigger interval
Shot	Shot number
Result	Alarm judgment result
Error	Error judgment
MT_State	MT method error-judgment
MD	MD value
CH**_error	Alarm judgment details
CH**_integral	Integral value
CH**_peak	Peak pressure value
CH**_peak_integral	Peak integral value
CH**_peak_time	Peak time
CH**_section_average	Interval average
CH**_section_integral_1	Interval integration value 1
CH**_section_integral_2	Interval integration value 2
CH**_point Monitor	Monitoring after T seconds
CH**_eject_Monitor	Ejection monitoring
CH**_Rising Time	Rising time
CH**_Falling Time	Falling time

6-4-2. List of Error Contents (Error Code)

After the error content is expressed in bits, it is changed to hexadecimal notation.

Bit	Error name	Output result
0	Integral value error	0001h
1	Average value error	0002h
2	Peak arrival time error	0004h
3	Peak integral value error	0008h
4	Monitoring after t seconds error	0010h
5	Rising time error	0020h
6	Falling time error	0040h
7	Interval average value error	0080h
8	Interval integral value error 1	0100h
9	Ejection monitoring error	0200h
10	Monitor zone 1 error	0400h
11	Monitor zone 2 error	0800h
12	Waveform monitoring error	1000h
13	Interval integral value error 2	4000h

●For the configuration of the digits of the output result (hexadecimal notation), refer to the following example.



6-4-3. Details of output results

(1) 1st digit

Hexadecimal	Binary number	Integral value error	Average value error	Peak arrival time error	Peak integral value error
0	0000				
1	0001				×
2	0010			×	
3	0011			×	×
4	0100		×		
5	0101		×		×
6	0110		×	×	
7	0111		×	×	×
8	1000	×			
9	1001	×			×
A	1010	×		×	
B	1011	×		×	×
C	1100	×	×		
D	1101	×	×		×
E	1110	×	×	×	
F	1111	×	×	×	×

(2) 2nd digit

Hexadecimal	Binary number	Monitoring after t seconds error	Rising time error	Falling time error	Interval average value error
0	0000				
1	0001				×
2	0010			×	
3	0011			×	×
4	0100		×		
5	0101		×		×
6	0110		×	×	
7	0111		×	×	×
8	1000	×			
9	1001	×			×
A	1010	×		×	
B	1011	×		×	×
C	1100	×	×		
D	1101	×	×		×
E	1110	×	×	×	
F	1111	×	×	×	×

(3) 3rd digit

Hexadecimal	Binary number	Monitoring zone 2 Error	Monitoring zone 1 Error	Ejection monitoring error	Interval integral value error 1
0	0000				
1	0001				×
2	0010			×	
3	0011			×	×
4	0100		×		
5	0101		×		×
6	0110		×	×	
7	0111		×	×	×
8	1000	×			
9	1001	×			×
A	1010	×		×	
B	1011	×		×	×
C	1100	×	×		
D	1101	×	×		×
E	1110	×	×	×	
F	1111	×	×	×	×

(4) 4th digit

Hexadecimal	Binary number	Spare	Interval integral value error 2	Spare	Waveform monitoring error
0	0000				
1	0001				×
2	0010			×	
3	0011			×	×
4	0100		×		
5	0101		×		×
6	0110		×	×	
7	0111		×	×	×
8	1000	×			
9	1001	×			×
A	1010	×		×	
B	1011	×		×	×
C	1100	×	×		
D	1101	×	×		×
E	1110	×	×	×	
F	1111	×	×	×	×

7.Connecting to external devices

7-1. Connection to analog measuring equipment

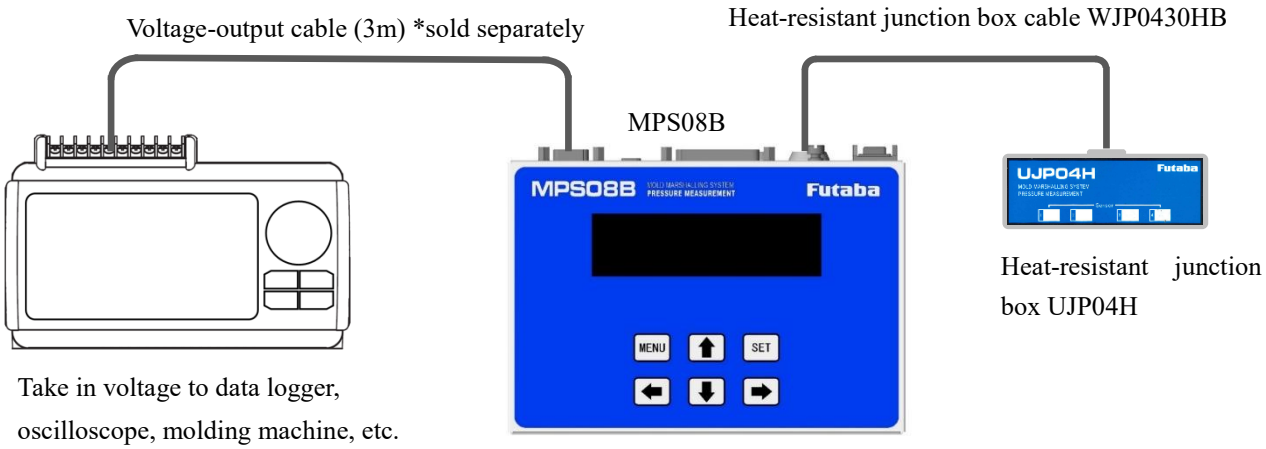
It is possible to measure waveforms and numerical values by capturing MPS08B output-voltage to an external device.

7-1-1. System configuration

The following figure shows the system configuration when using the MPS08B to import data to analog measurement devices (data logger, oscilloscope, etc.).

※Connect the optional 3m cable with the model number: WCI0830-V-D9P-Y N-MPS08B.

When MPS08B is expanded, it is required for the respective MPS08B.



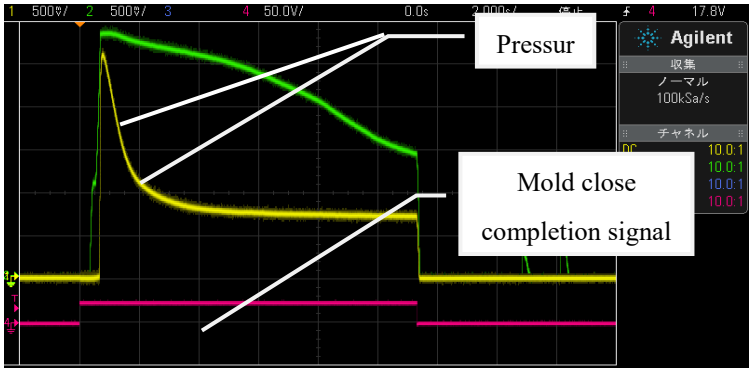
7-1-2. Conversion of output voltage and pressure value

Outputs 20MPa per 1V. (Ex.: When the pressure is 100MPa, 5V is outputted.)

●The voltage-output range is 0V～10V.

7-1-3. Example of pressure waveform measurement

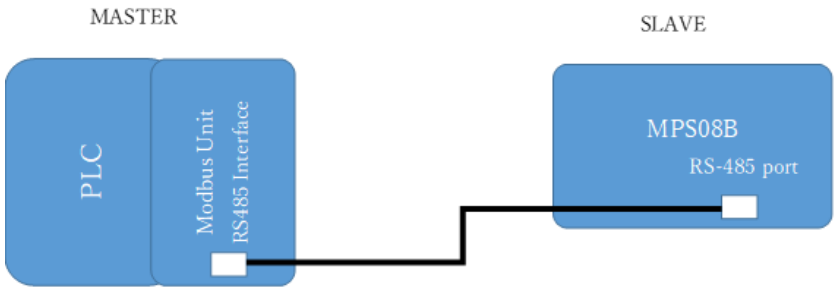
The figure below shows an example of measurement using a digital oscilloscope.



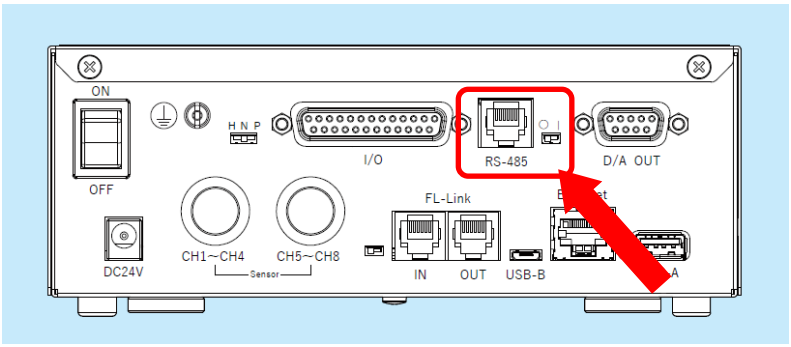
7-2. Data communication via Modbus communication

Internal data can be read and written by connecting the unit and PC with RS485 cables.

7-2-1. System configuration

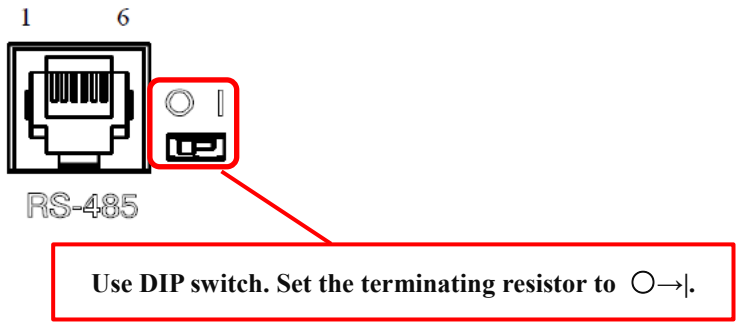


■Connection port

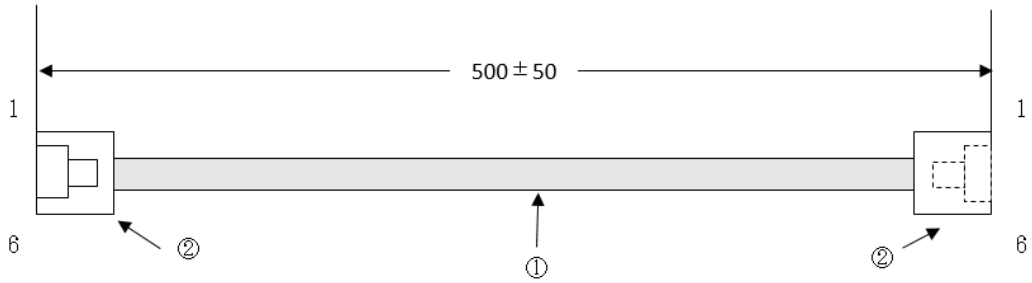


MPS08B Modbus communication port pin assignments

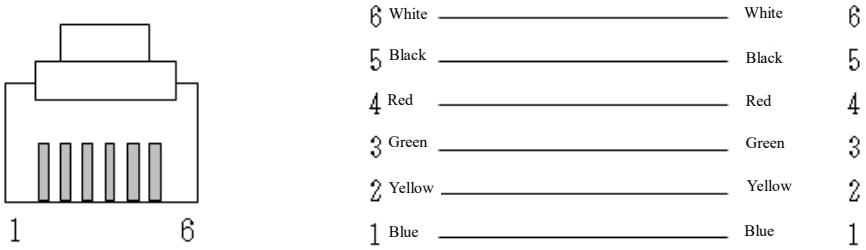
Pin No.	Signal name	Remarks
1	RS485(A)	RS485 signal A (Connected internally with pin number 3)
2	0V	Ground
3	RS485(A)	RS485 signal A (Connected internally with pin number 1)
4	RS485(B)	RS485 signal A (Connected internally with pin number 6)
5	F.G.	Frame Ground
6	RS485(B)	RS485 signal A (Connected internally with pin number 4)



■Link cable



Cable wiring



7-2-1. MODBUS communication specifications

Item No.	Item	Specifications
1	Interface	EIA standard RS485 compliant
2	Transmission path	2-wire, multi-drop
3	Transmission distance	Maximum 500 m
4	Transmission rate (bps)	19200
5	Communication method	Half duplex
6	Synchronous system	Start-stop synchronization
7	Data format	Start bit :1
		Data bit :8
		Parity bit: None
		Stop bit :1
8	Maximum number of units connected	32 units including master (constrained by physical layer)
9	Signal logic	V(A)>V(B) 0 (space)
		V(A)<V(B) 1 (mark)
10	Protocol	Modbus
11	Transmission mode	RTU
12	Function code	03H (Holding Register Read)
		08H (Communication Diagnostic Loopback Test)
13	Error control	Parity check, CRC-16
14	Error code	01H (Function code defective)
		02H (data address error)
		03H (data-value error)
		04H (miscellaneous device error)

7-2-2. Formatting on Read

■Read request from the master

Slave address		01h
Function code		03h
Start address	Upper	10h
	Lower	04h
Number of registers	Upper	00h
	Lower	02h
Error checking CRC-16 Modbus	CRC upper	81h
	CRC lower	0Ah

■Response from the slave

Slave address		01h
Function code		03h
Number of data bytes		04h
Data 1 (Upper)		42h
Data 1 (Lower)		55h
Data 2 (Upper)		3Ch
Data 2 (Lower)		0Dh
Error checking CRC-16 Modbus	CRC upper	2Eh
	CRC lower	9Eh

7-2-3. Formatting on Write

■Write request from the master

Slave address		01h
Function code		06h
Start address	Top level	01h
	Lower	20h
Number of registers	Top level	00h
	Lower	01h
Error checking CRC-16 Modbus	CRC low order	48h
	CRC top	3Ch

■Response from the slave (When the writing finishes normally, the same command as the request is responded.)

Slave address		01h
Function code		06h
Answer message Upon successful completion of writing Returns the same code as the request.		01h
		20h
		00h
		01h
Error checking CRC-16 Modbus	CRC upper	48h
	CRC lower	3Ch

7-2-4. Modbus map

Address	Item	Description	R/W
0000	Equipment number upper		R0
0001	Equipment number lower		R0
0002	Version ID upper		R0
0003	Version ID lower		R0
0004	Master address Slave address	0:Master 1:Slave1, 2:Slave2, 3:Slave3	R0
0110	Input Port Status	b[0]: Status of IN port1 ・・・ b[9]: Status of IN port10	R0
0111	Output Port Status	b[0]: Status of OUT PORT1 ・・・ b[9]: Status of OUT port10	R0
0112	OK count upper	Shot OK count	R0
0113	OK count lower		R0
0114	NG count upper	Shot NG count	R0
0115	NG count lower		R0
0116	Shot count upper	Shot count	R0
0117	Shot count lower		R0
0118	NG continuous count upper	Continuous NG	R0
0119	NG continuous count lower		R0
0120	File number used	File number 1～100	RW
0121	Read file selection (ReadFileNumber)	File number 1～100	RW

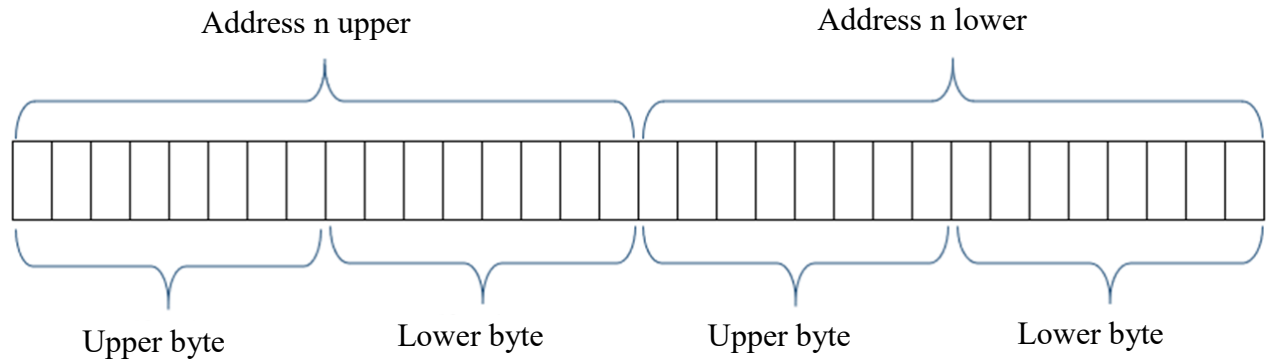
nm00	Overall error status upper	Error judgment per channel 0 for success, 1 for error b[0]: Accumulated value error b[1]: Average value error b[2]: Peak time error b[3]: Peak accumulated value error b[4]: Judgment error after t seconds b[5]: Rising time error b[6]: Falling time error b[7]: Interval average value error b[8]: Interval integral value 1 error b[9]: Ejection error b[10]: Monitoring zone 1 error b[11]: Monitoring zone 2 error b[12]: Waveform monitoring error b[14]: Interval integral value 2 error	R0
nm01	Overall error status lower		R0
nm02	Higher integration value	Integration <float>	R0
nm03	Integral value low order		R0
nm04	Upper peak value	Peak-value <float>	R0
nm05	Lower peak value		R0
nm06	Higher peak integration value	Peak-integral <float>	R0
nm07	Peak integration value low order		R0
nm08	High peak time	Peak hours [ms]	R0
nm09	Lower peak time		R0
nm0A	Higher interval mean value	Interval average <float>	R0
nm0B	Interval mean lower		R0
nm0C	Interval integration value 1 high	Interval integration 1<float>	R0
nm0D	Interval integral value 1 low		R0
nm0E	Top value after t seconds	Value after t seconds <float>	R0
nm0F	Value after t seconds Lower		R0
nm10	Higher limit of projection	Max. ejection <float>	R0
nm11	Extrusion Max. value lower		R0
nm12	Upper rise time	Rising time [ms]	R0
nm13	Rise Time Lower		R0
nm14	Descent time upper	Falling time [ms]	R0
nm15	Descent Time Lower		R0
nm16	Interval integration value 2 high	Interval integration 2<float>	R0
nm17	Interval integration value 2 low		R0
n is 1,2, m is 0 to F 10 to 2F for 32 channels. CH01 is nm=10, CH02 is nm=11, ・・・CH16 is nm=1F, CH17 is nm=20... CH32 is nm=2F			

The above data is updated after the measurement is completed, and the value is retained until the measurement of the next shot is completed.

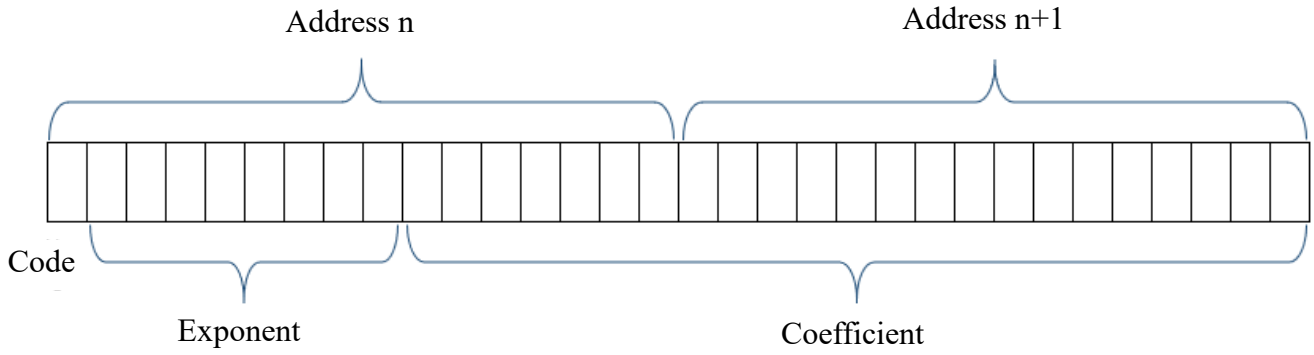
3x00	Measurement time upper	1,000[ms]～120,000[ms]	R0
3x01	Measurement time lower		R0
3x02	Sampling time upper	1[ms],2,5,10,20,50,100,200,500,1000	R0
3x03	Sampling time lower		R0
3x04	Sensor unit	0:MPa, 1:kgf/cm2, 2:psi, 3:bar	R0
x is 10 files from 0 to 9 (read file selection: ReadFileNumber) + x = file number)			

3x○○ should be used only for 30○○ and the file number should be set at 0121 to correspond to 100.

■Data for which the address is divided into upper and lower (e.g. shot count, integral value, peak value)



■Addresses are divided into upper and lower, and <float> data. (Integral value, peak value, etc.)



Input Status :Interfaces that can only be read in 1bit.

Coil :Interfaces that can be read and written in1bit.

Input Register :Interfaces that can only be read in16bit.

Holding Register :Interfaces that can be read and written in16bit.

	Function code
Read holding register	03h
Write holding register	06h

7-2-5. Example of Modbus Request, Response

Peak-pressure 53.3MPa and integral 86.1MPa・s

Software version Ver.1.1.4.0

The transmission data and reception data to be described are in hexadecimal.

The transmitted data is SLAVE(MPS08B) from MASTER (external device).

■For CH1 peak-pressure data-request 53.3MPa

Transmit-data 01 03 10 04 00 02 81 0A

Receive 01 03 04 42 55 3C 0D 2E 9E

42553C0Dh is 53.31 for single precision floating point (float).

■For CH1 integral data-request 86.1MPa・s

Transmit 01 03 10 02 00 02 61 0B

Receive 01 03 04 42 AC 40 50 1F 96

42AC4050h is 86.13 for single precision floating point (float).

■For software-version ID request Version 1.1.4.0

Transmit-data 01 03 00 02 00 02 65 CB

Receive 01 03 04 01 01 04 00 AB CF

01010400h represents the 1.1.4.0 version4 numbers in 1-byte (2-digit hexadecimal) units.

■For shot count data request of 36

Transmit data 01 03 01 16 00 02 24 33

Receive 01 03 04 00 00 00 1E 7A 3B

0000001Eh is 36 in decimal.

■For selection of the measurement condition file, file No.1

Transmit 01 06 01 20 00 01 48 3C

Receive 01 06 01 20 00 01 48 3C

8.Supplementary material

8-1. Supplementary materials for setting alarm monitoring zone

8-1-1. Monitoring zone 1/monitoring zone 2

Set the monitoring zone at any time and value and monitor whether the measured value is within that zone.

(1)Check the check box to enable the alarm judgment function.

(2)Enter the time and value within the measurement time.

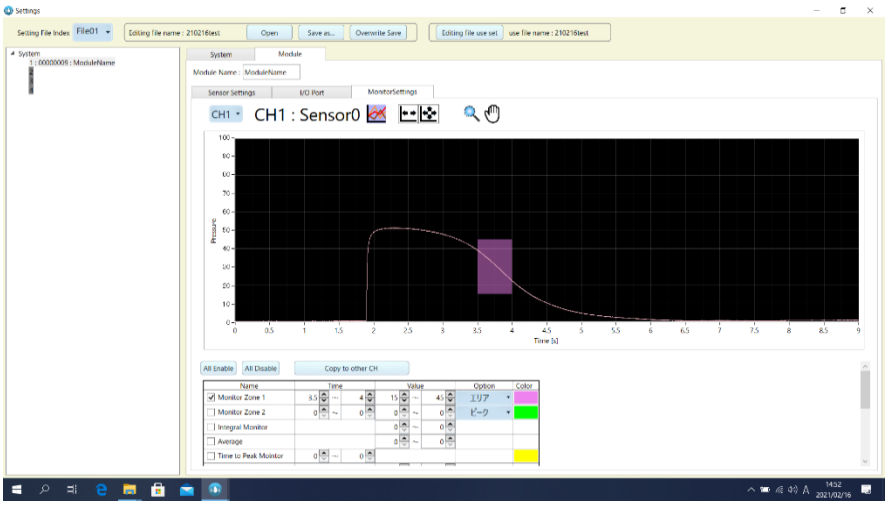
The range entered in the frame screen is displayed as the monitoring zone.

●Time: 0.00 seconds to within the measurement time can be set in increments of 0.01 seconds.

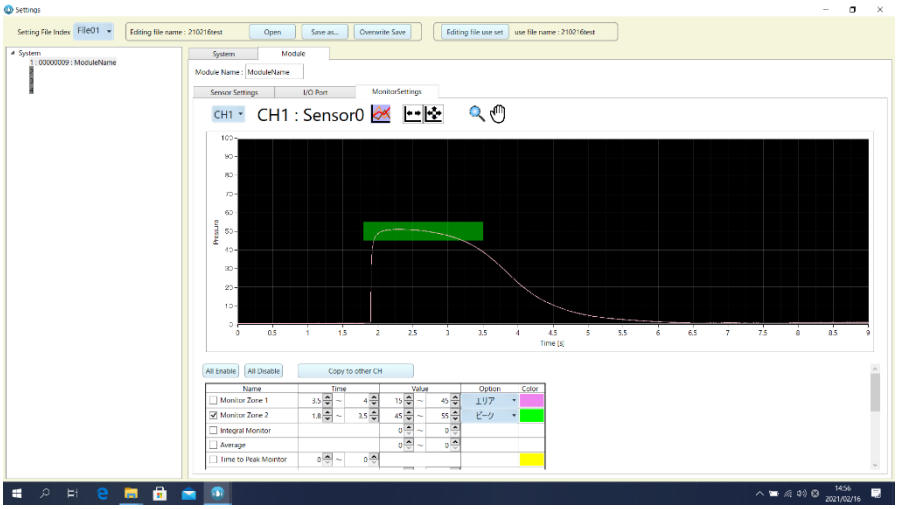
●Value: Can be set in 0.0MPa ～ 0.01MPa.

(3)Select a peak or area from the options.

・Peak



・Area

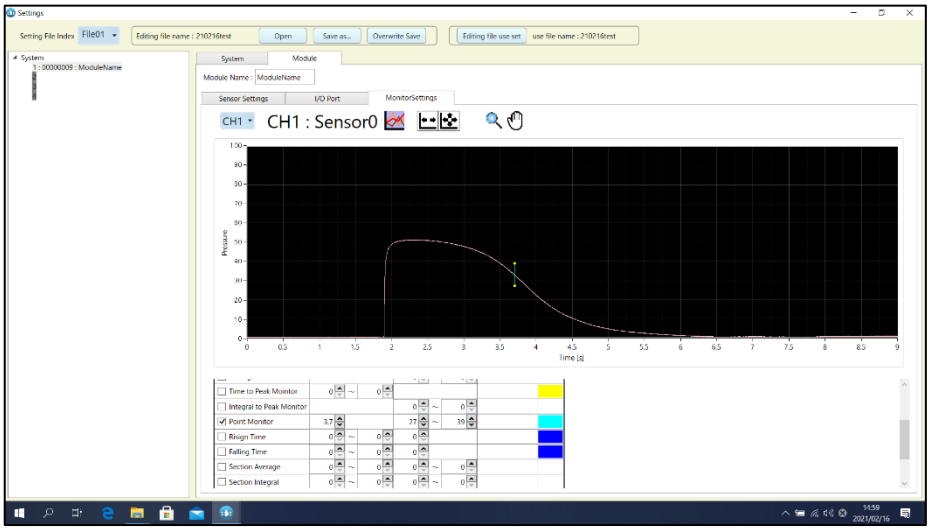


8-1-2. Point monitor

Monitors whether the pressure value at the set time (t seconds) has elapsed is within the monitored pressure range.

(1)Check the check box to enable the alarm judgment function.

(2)Enter a value directly to confirm the range.



●Time: 0.00 seconds to within the measurement time can be set in increments of 0.01 seconds.

●Value: Can be set in 0.0MPa ～ 0.01MPa.

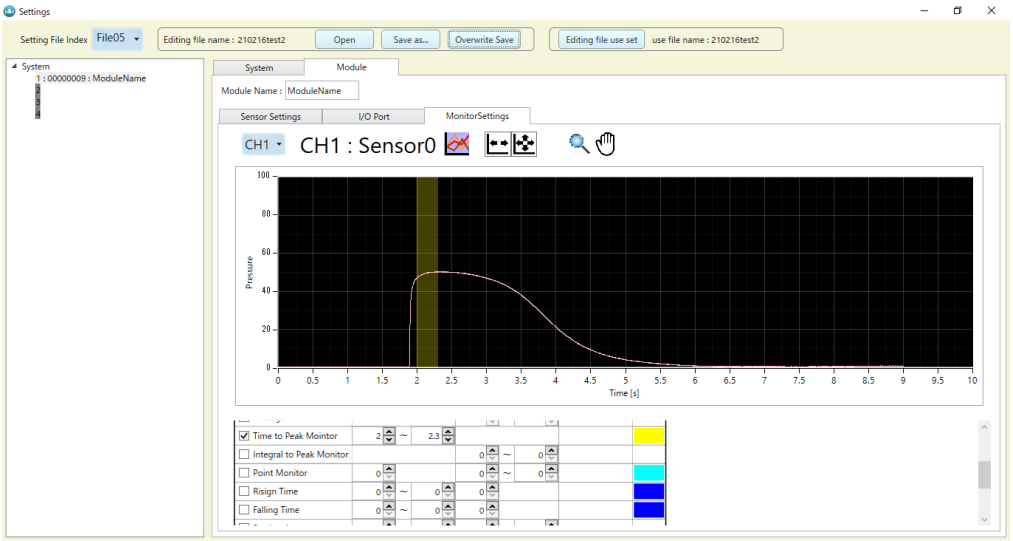
8-1-3. Time to peak monitor

Monitor whether the maximum pressure value (peak pressure value) in one molding cycle is within the monitoring time.

(1)Check the check box to enable the alarm judgment function.

(2)Enter the monitoring time within the measurement time.

The range entered in the frame screen is displayed as the monitoring range.



●Time: 0.00 seconds to within the measurement time can be set in increments of 0.01 seconds.

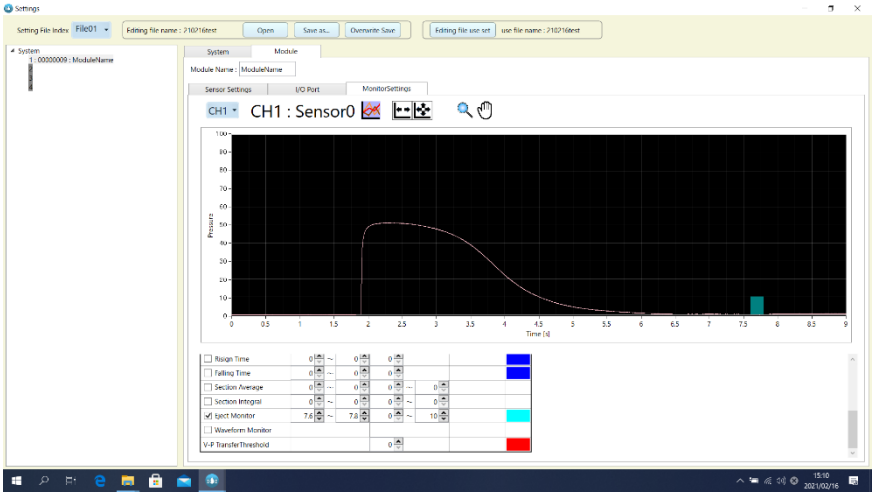
8-1-4. Ejection monitoring

Set up a monitoring zone for the pressure applied during ejection after molding and monitor whether the peak pressure value and time are within the monitoring zone.

(1)Check the check box to enable the alarm judgment function.

(2)Enter the time and value within the measurement time.

The range entered in the frame screen is displayed as the monitoring range.



●Time: 0.00 seconds to within the measurement time can be set in increments of 0.01 seconds.

●Value: Can be set in 0.0MPa ～ 0.01MPa.

8-1-5. Integral monitor

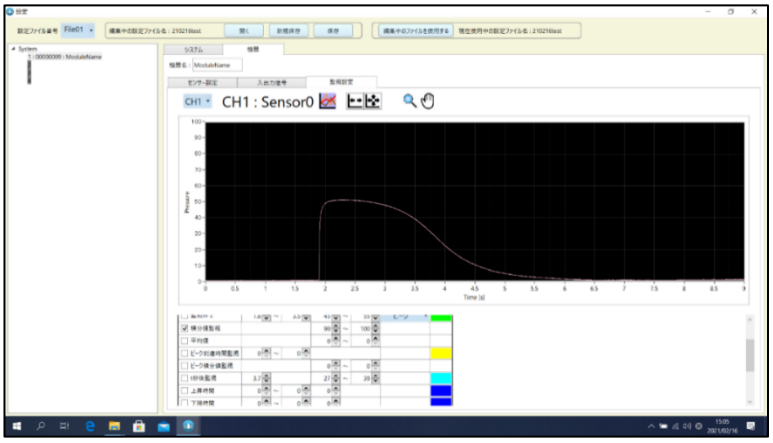
Monitors whether the integrated value (area surrounded by pressure waveform and time axis) within the measurement time is within the set range.

(1)Check the check box to enable the alarm judgment function.

(2)Enter a value.

※There is no visible monitoring zone for integral monitor.

On the measurement screen, click the "Cursor Tool" and place the cursor at any position to display the elapsed time and integral value at that position.



●Value: Can be set in 0.0MPa ～ 0.01MPa.

8-1-6. Integral peak monitor

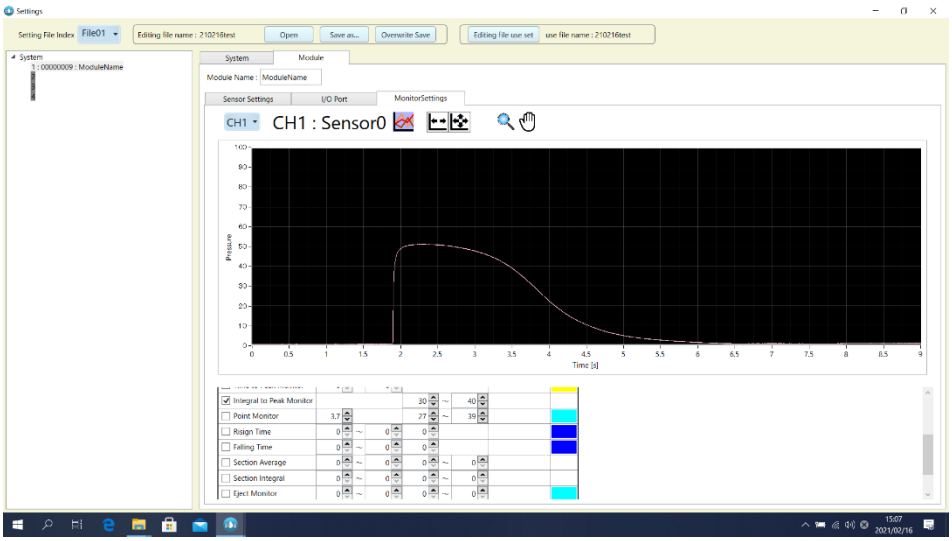
Monitors whether the integral value until the peak pressure is reached within the measurement time is within the set integral value range.

(1)Check the check box to enable the alarm judgment function.

(2) Enter a value.

※There is no visible monitoring zone for integral value monitoring.

On the measurement screen, click the "Cursor Tool" and place the cursor at any position to display the elapsed time and integral value at that position.



●Value: Can be set in 0.0MPa ～ 0.01MPa.

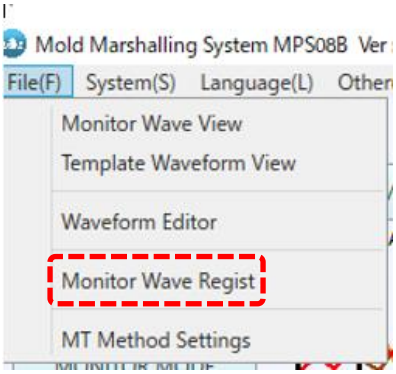
8-1-7. Waveform monitor

The allowable upper and lower limits are set for the reference waveform, and it is monitored whether it is within the range.

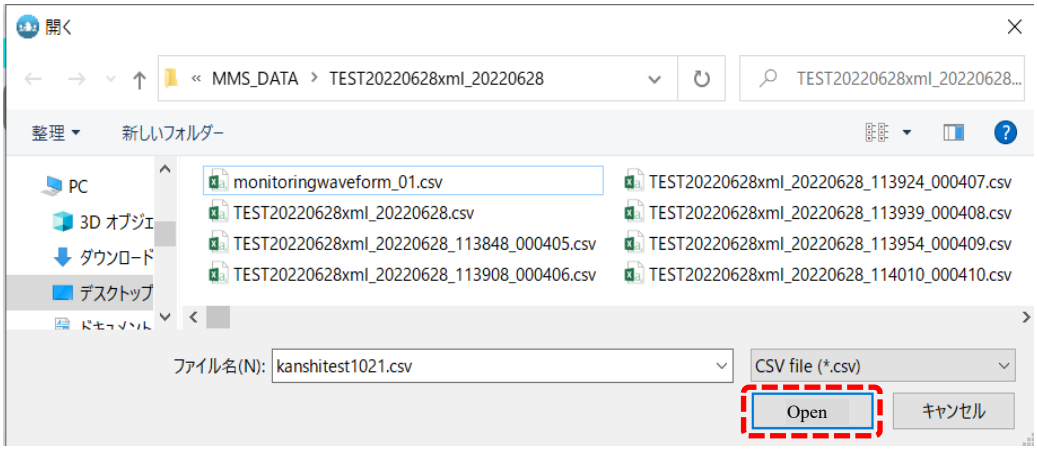
●To use this function, a monitoring waveform must be created in advance.

■Registering the monitoring waveform

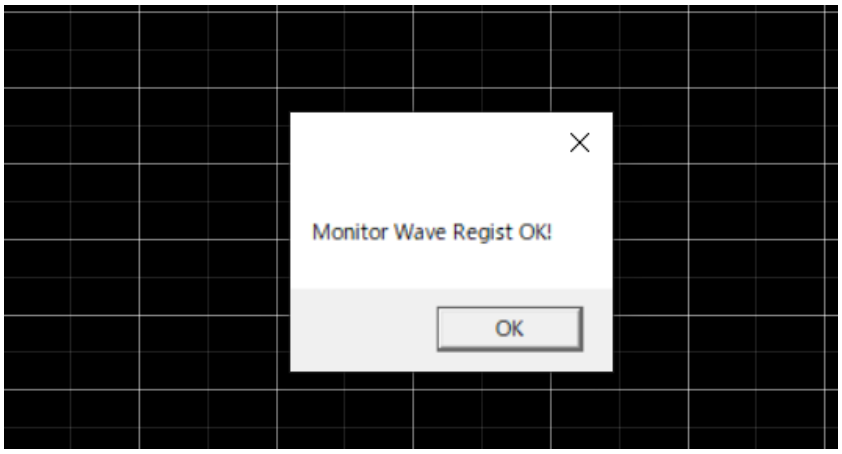
① Click "Monitor Wave Regist" in the operation menu and select the arbitrary waveform data.



② Select the data to be registered and press the "Open" button.



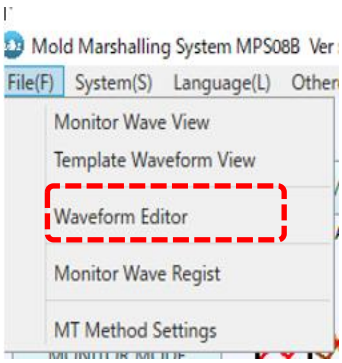
③ A pop-up appears when registration is complete.

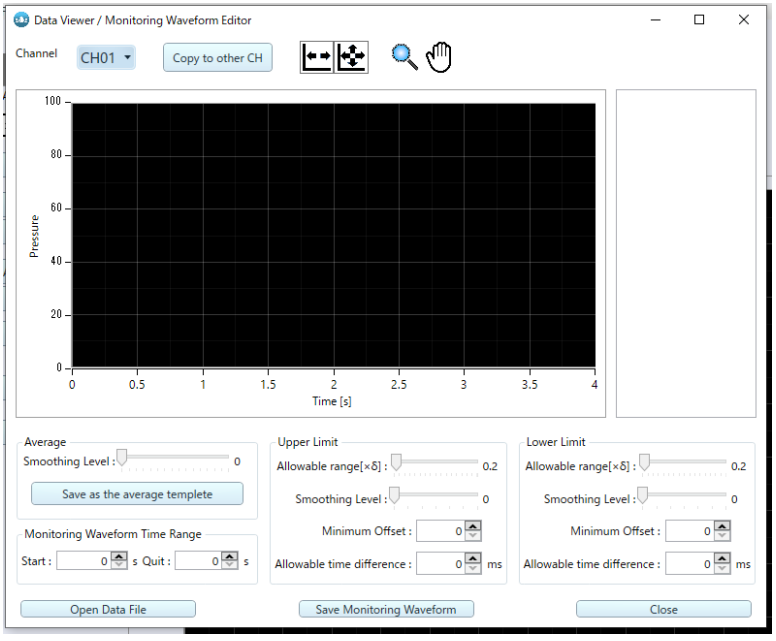


■Creation and setting of monitoring waveform

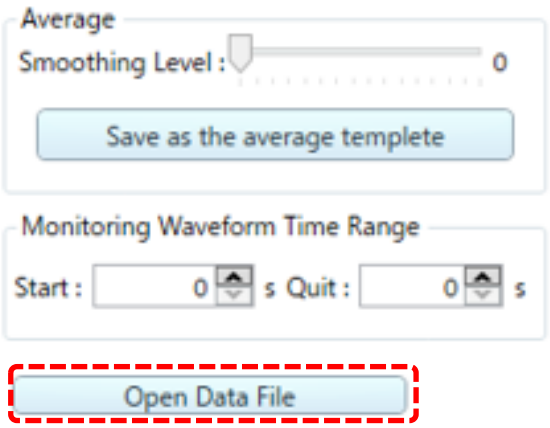
① Click "Waveform Editor" in the operation menu.

Data Viewer/Monitoring Waveform Editor screen is displayed.



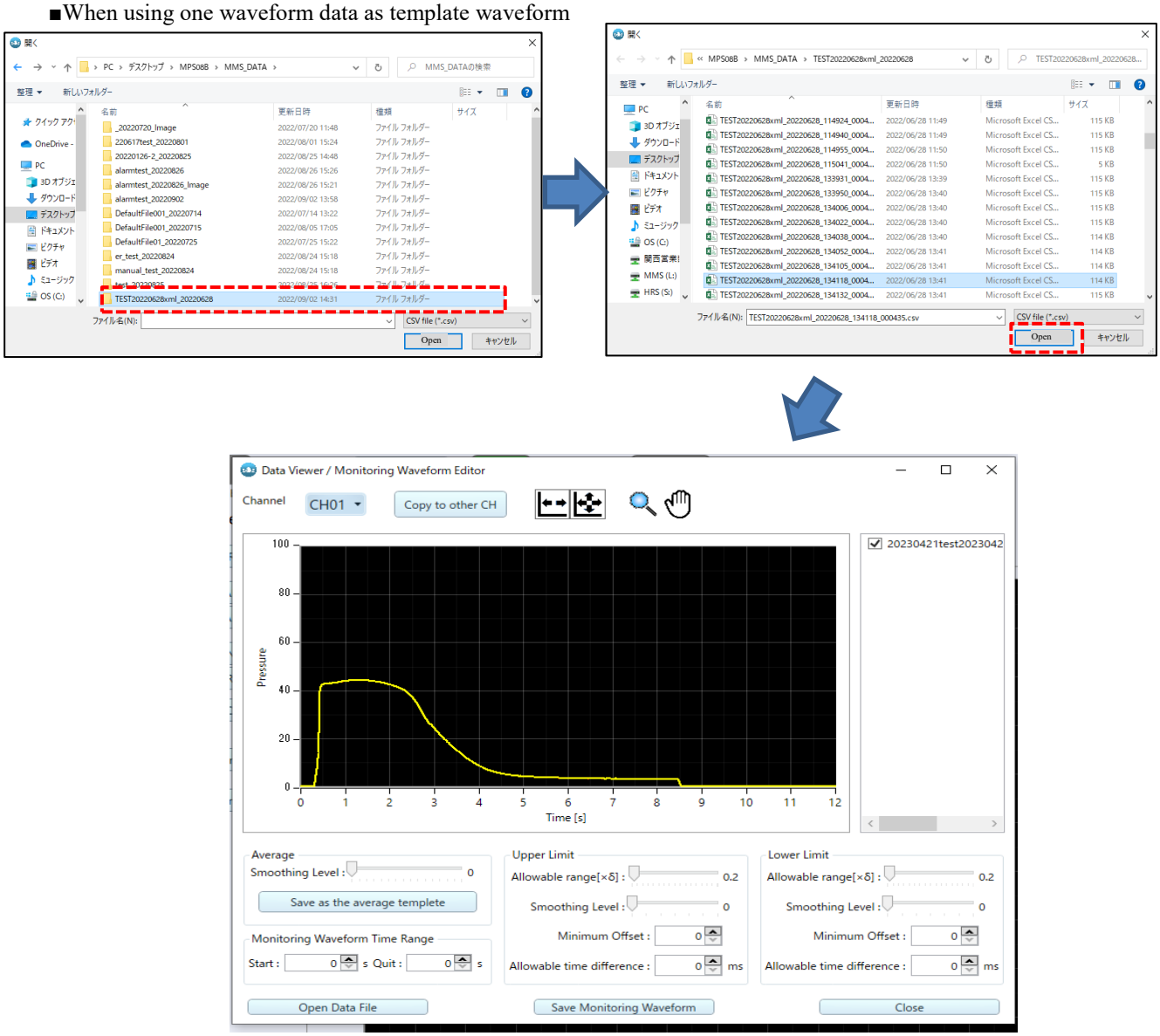


② Press the "Open Data File" button at the lower left of Data Viewer/Monitoring Waveform Editor screen.



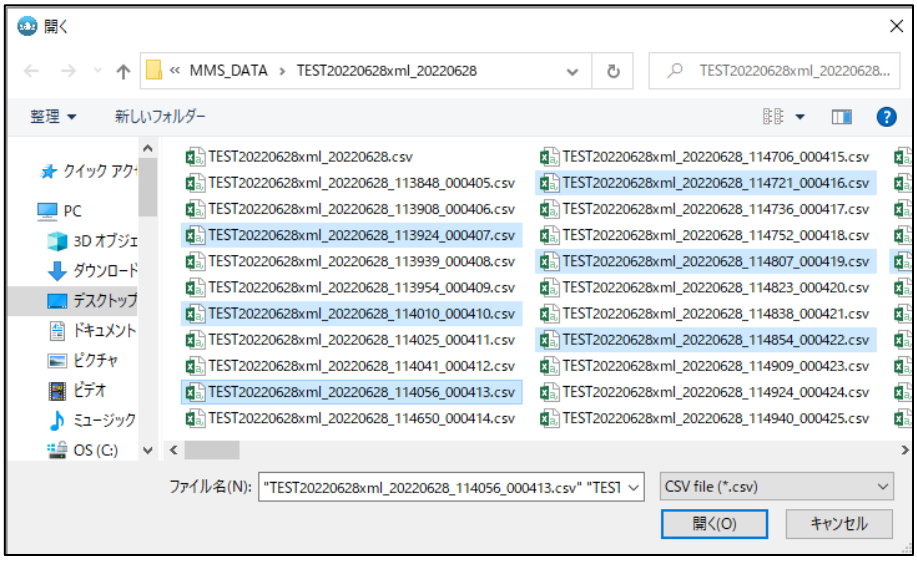
③ The file name selection screen is displayed. Select the waveform data you want to set as the template waveform and select "Open".

■When using one waveform data as template waveform

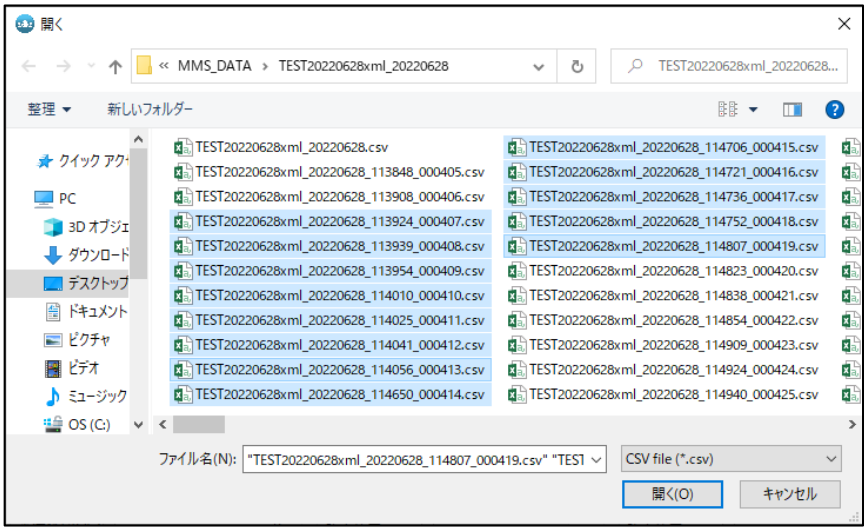


■When creating a reference waveform from multiple waveform data

※To search for any more than one file, hold down Ctrl as you select the file.



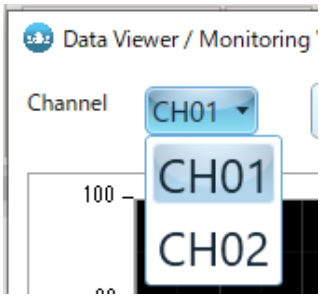
※To select multiple contiguous files, click on the first file, hold down the Shift key, and select the last file.



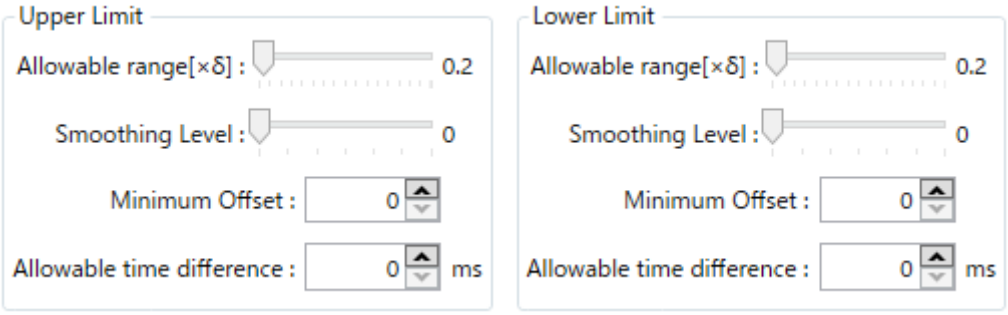
※The average of multiple waveform data can be used as template waveform.

(Green: Multiple waveforms　Yellow: Template waveform based on green)

④ Select the channel to set the monitoring frame from " Data Viewer/Monitoring Waveform Editor " → "Channel".



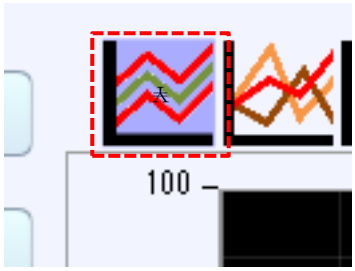
⑤ Set the upper and lower limits of the template waveform. ※Check the following items.



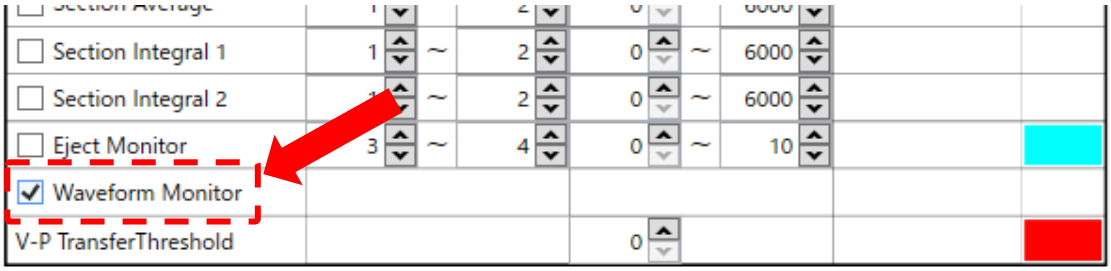
Average	Smoothing level	Replace the value of all points in the measurement data with the value obtained by taking the average with n points before and after (the value selected by the n = smoothing level) including that point.
	Save as average template waveform	The smoothed waveform is saved as the template waveform.
Monitoring waveform valid time		Set the monitoring start and end times within a shot.
Monitoring waveform upper limit / Monitoring waveform lower limit	Allowable range (xσ)	The standard deviation calculated at each point is multiplied by the magnification set here.
	Smoothing level	Rewrites the value of all points of the monitoring waveform upper/lower limit to the value obtained by taking the average at the previous/next n points (value selected at n = smoothing level) including that point.
	Minimum offset	Set the lowest value of the upper/lower limit of the monitoring waveform from the template waveform.
	Allowable time difference	Set the offset in the horizontal axis (time direction) at the timing when the value changes in a short time (such as immediately after injection).
Open the measurement data		Select the waveform to be the base of the monitoring waveform from the past measurement data.
Save monitored waveforms		Saves the currently displayed monitored waveform as a new name.

■Monitoring waveform display/hide

Click the monitor waveform display/hide button to switch.

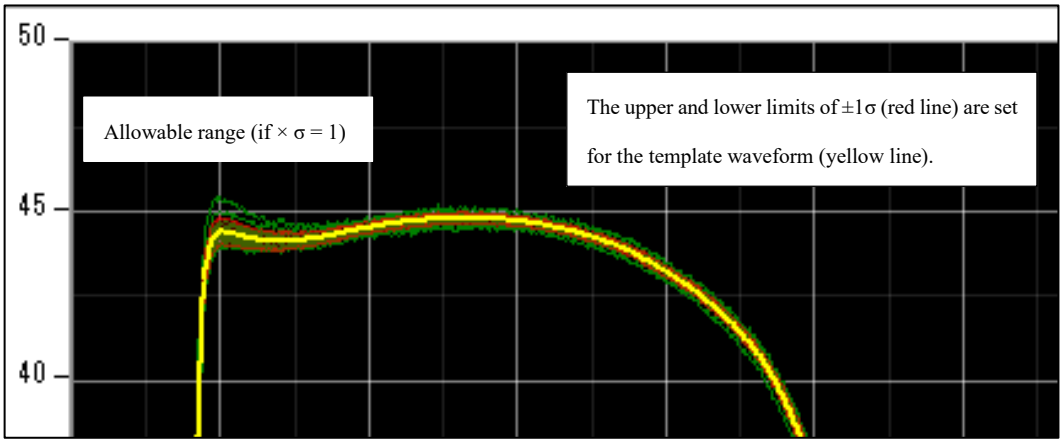


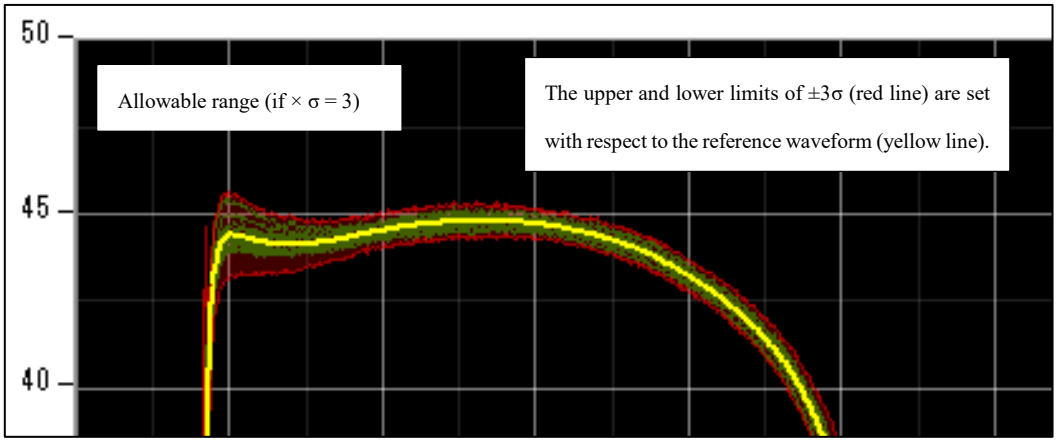
Click "Settings"-> "Module"-> "Monitor Settings" and select the checkbox of the Waveform Monitor at the bottom.



■Allowable range (×σ)

When a template waveform is set from multiple waveform data, the standard deviation at each point of the selected waveform is calculated, and the upper and lower limits are set by offsetting the standard deviation from the template waveform. The standard deviation is calculated for all points at each sampling interval. Setting values can be selected in " Allowable range (xσ)".

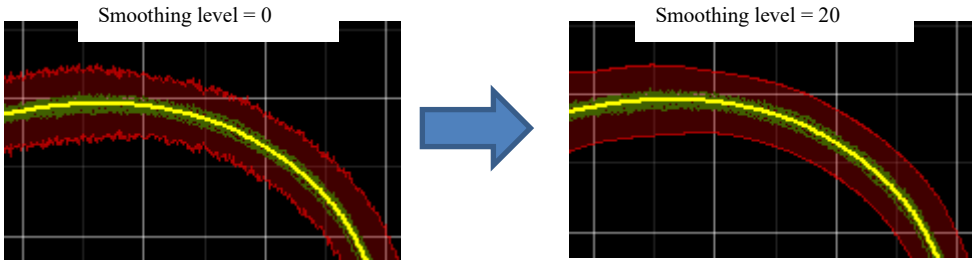




■Smoothing level

Smoothly corrects the template waveform and upper and lower limits.

Increasing the Smoothing level setting value will make them smoother.

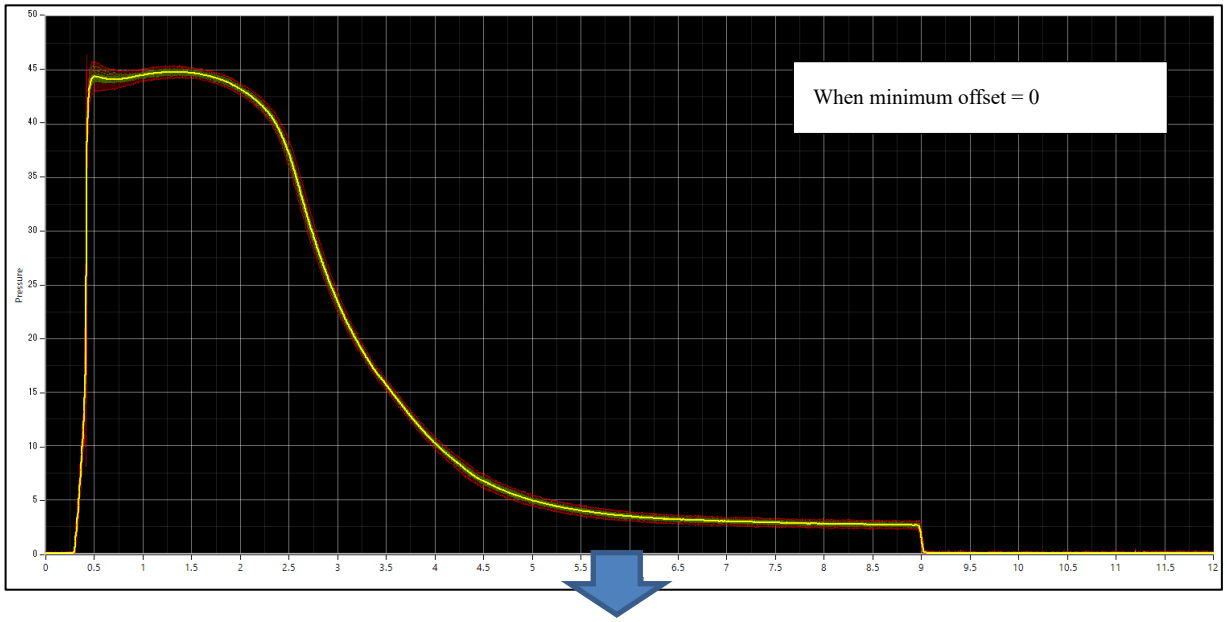


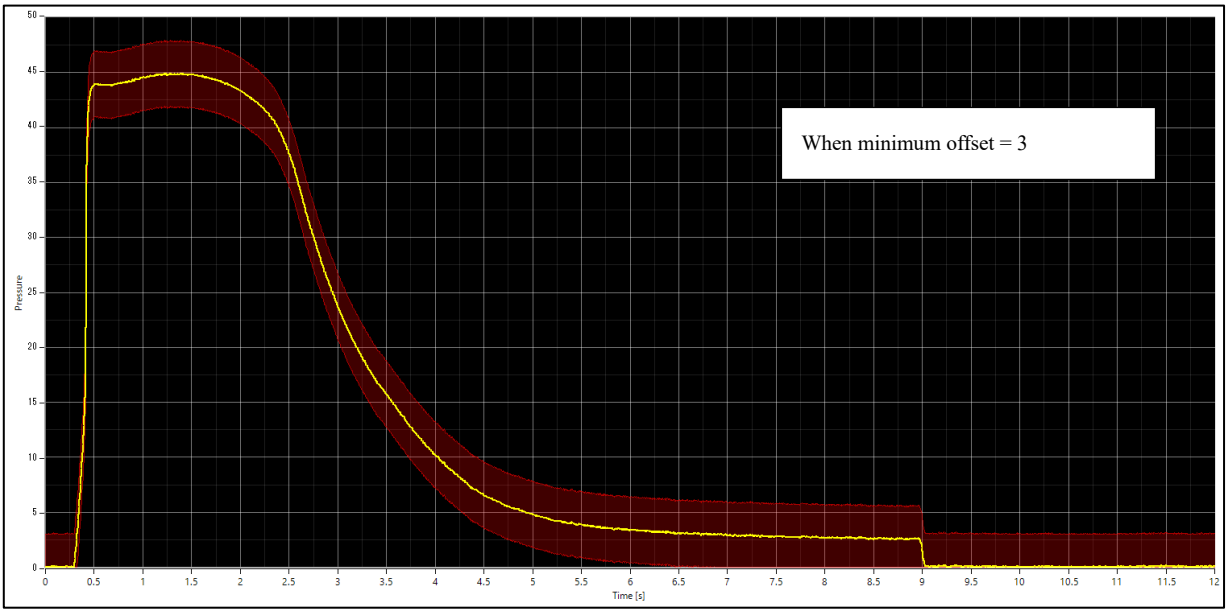
■Minimum offset

If the range between the upper and lower limits of pressure is too small, specify the allowable pressure difference to increase the monitoring width.

The upper limit is offset from the template waveform in the positive direction of the Y-axis, and the lower limit is offset from the template waveform in the negative direction of the Y-axis by the specified value.

※The value set in "Minimum offset" has priority over the value set in " Allowable range (× σ)".

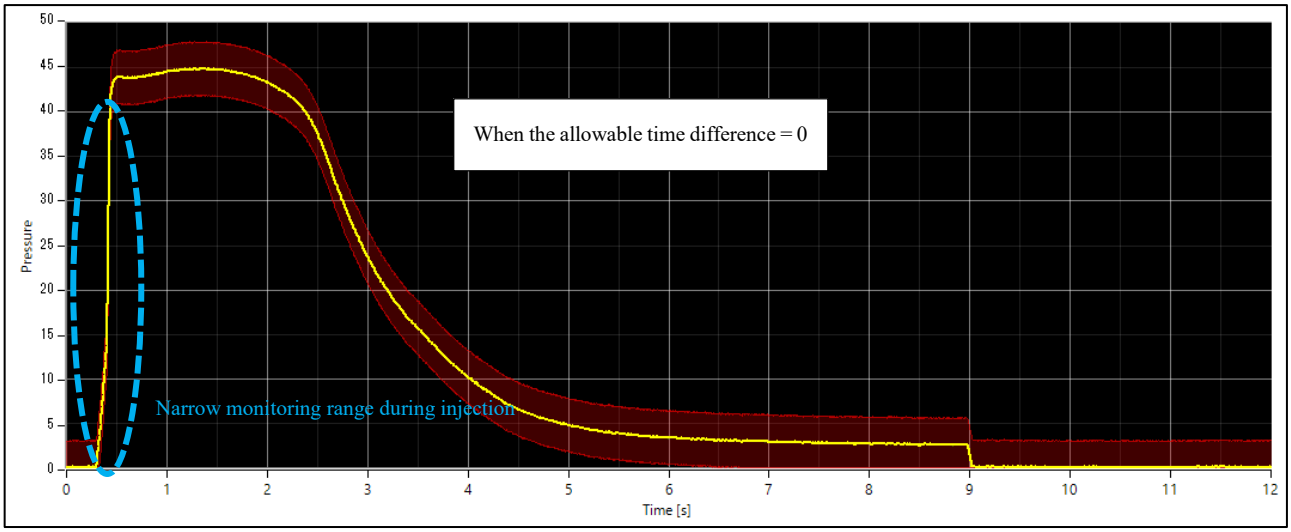


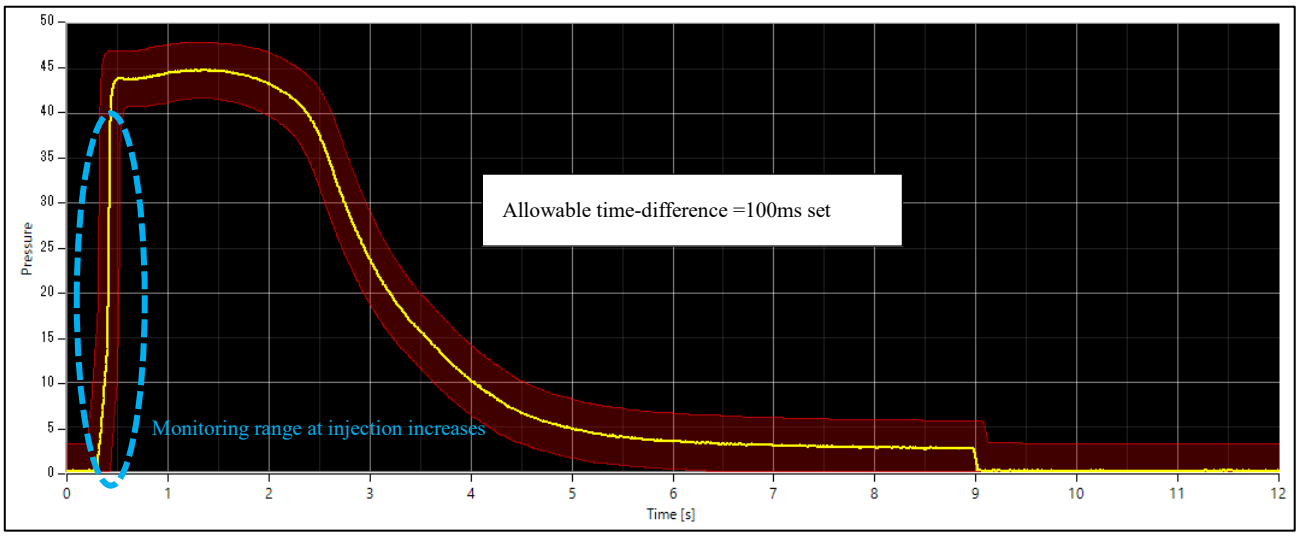


■Allowable time difference

If the width of the upper and lower limits of the elapsed time is too small, set the allowable time difference to increase the width.

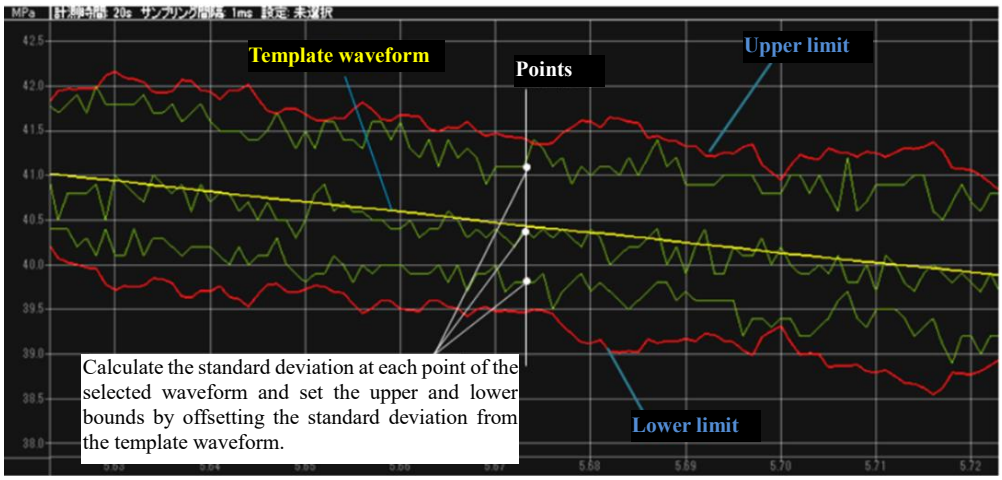
(This is mainly used when you would like to increase the monitoring range at injection.)





※1 Allowable range (×σ)

[Offset amount from the template waveform = Setting value of allowable range × Standard deviation at each point]

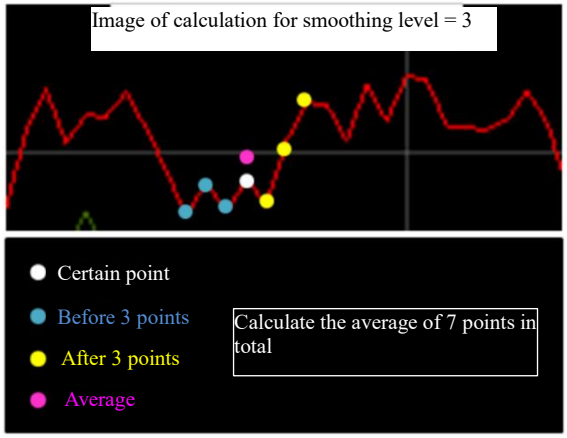


※2 Smoothing level

Smoothing is performed by using the average value of the selected point and the points before and after it as the correction value. The number of points before and after can be selected at the smoothing level.

Example：When smoothing level = 3

The average value of a point and three points before and after it (total of seven points) is taken as the value.



・Save average as template waveform

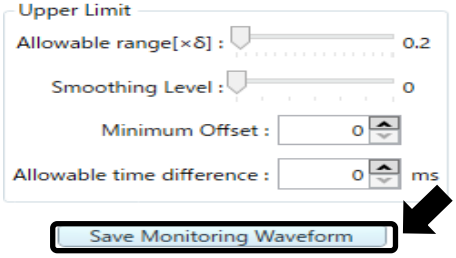
The smoothed waveform is saved as the template waveform.

・Monitoring waveform validity period

Set the monitoring start and end times within a shot.

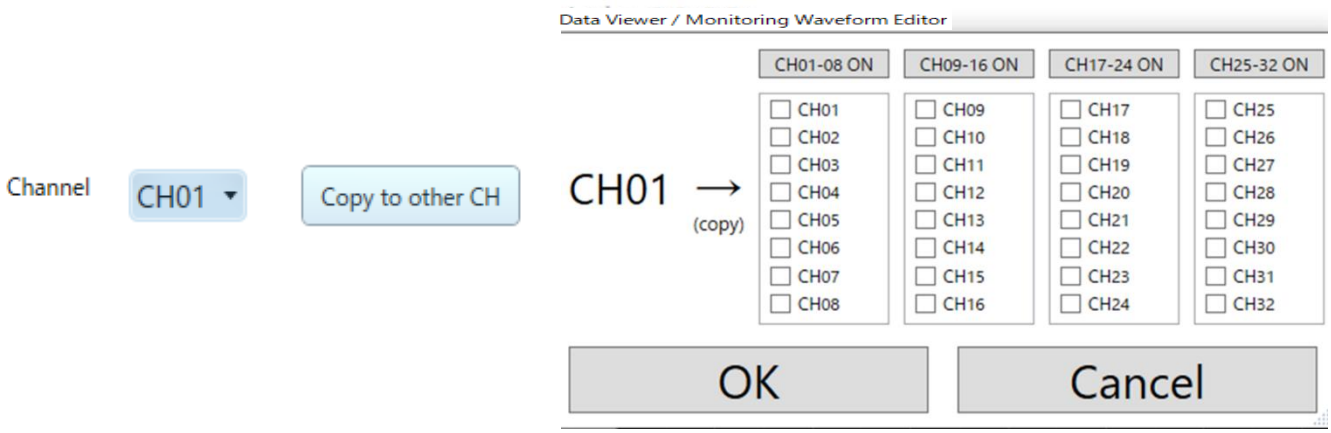
・Save the monitoring waveform

When all settings are complete, press Save Monitoring Waveform.



■Copying Monitoring Waveform Data

Monitoring waveform settings can be copied to other channels. Select CH of the copy source, click "Copy to other channel", select the checkbox of CH to be copied, and press "OK" to finish the copy.

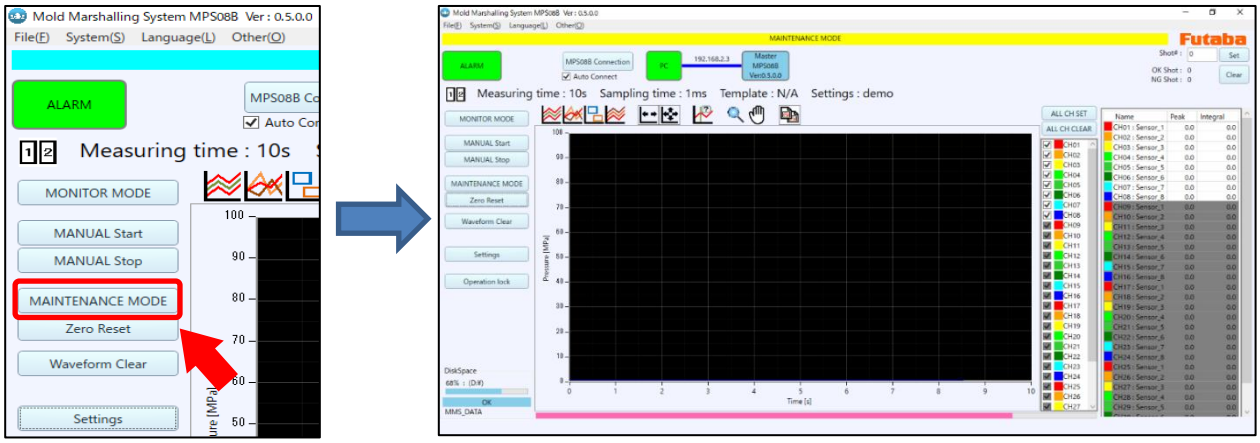


8-2. Measurement in maintenance mode

This measurement mode is convenient for checking the operation of the pressure sensor, such as installing the sensor in a mold.

8-2-1. Click "Maintenance mode".

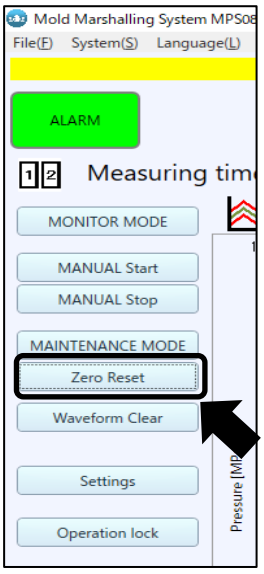
The mode switches to [Maintenance mode] and enters the constant measurement mode.



8-2-2. Click "Zero Reset"

Check that no pressure (load) is applied to the sensor, and click "Zero Reset".

The sensor output value is reset to zero.



8-2-3. Apply pressure to the tip of the sensor

The waveform is displayed if the sensor is operating.

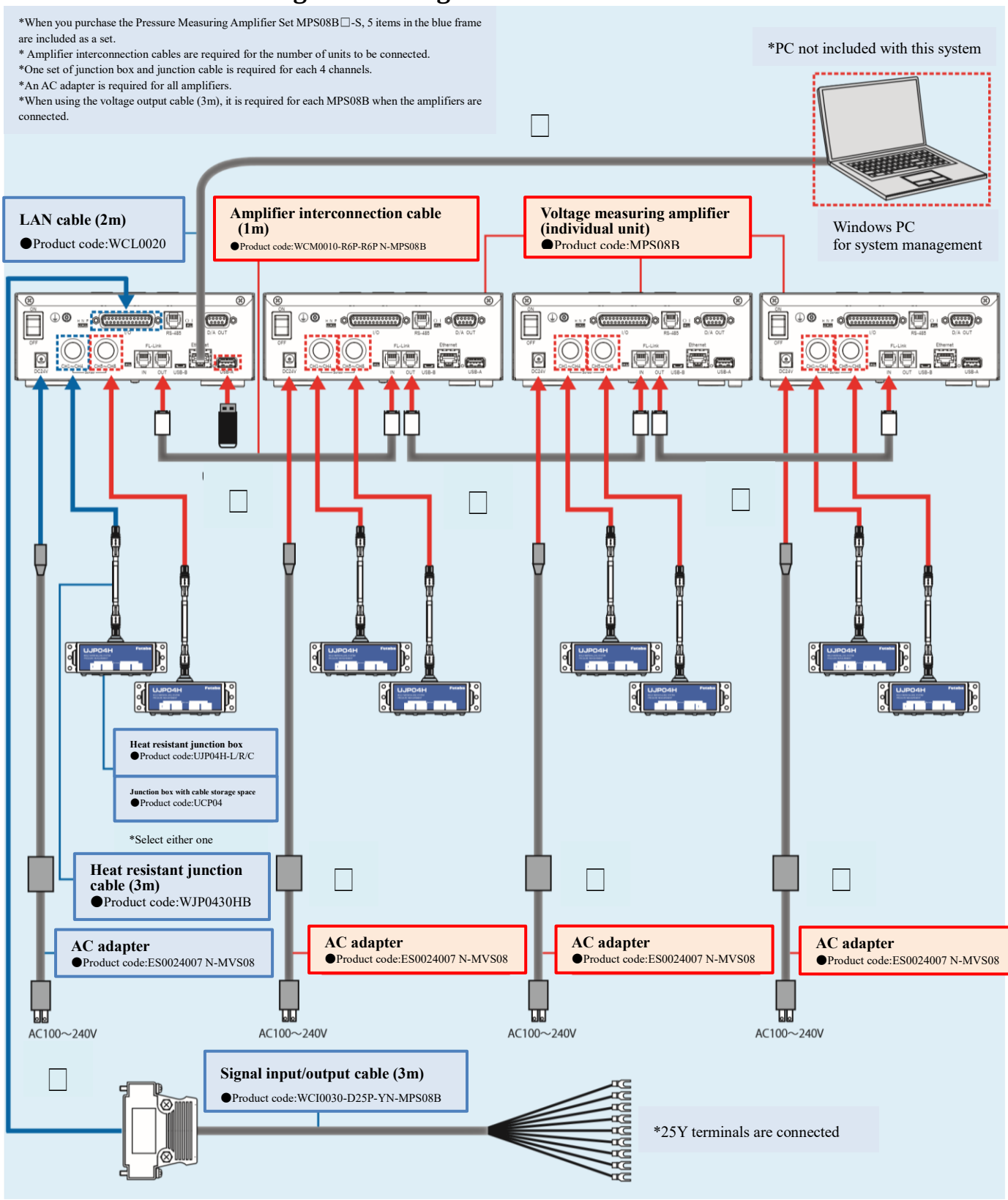
8-3. Amplifier expansion setting

By connecting up to four MPS08B, up to 32 points can be measured.

●If there are 8 or more pressure measurement points on the machine side, connect each device as shown in the basic configuration diagram below.

●Connect the power supply after completing all connections.

8-3-1. Extended configuration diagram



8-3-2. Connecting Devices

Follow the procedure below to connect devices. (The step number corresponds to the number in the extended configuration diagram.)

(1)MPS 08 B turn off the power

If you are expanding a system that has already been installed, turn off the power of the first MPS08B that will be the master unit.

(2)Install a MPS08B to expand

Install the second, third and fourth MPS08B units.

(3)Connecting the amplifier interconnection cable

Connect the first unit to the second unit, the second unit to the third unit, and the third unit to the fourth unit.

『FL-Link OUT』 of the first unit ⇔ 『FL-Link IN』 of the second unit.

『FL-Link OUT』 of the second unit ⇔ 『FL-Link IN』 of the third unit.

『FL-Link OUT』 of the third unit ⇔ 『FL-Link IN』 of the fourth unit.

●Turn on the terminator switches of the first and last connected MPS08B to "O" → " I ".

(Refer to 1-3-2. Connector Layout (P.7) for the location of the terminator switch.)

(4)Connect LAN cable and I/O signal cable to the first MPS08B.

All networking is done through the first master unit.

Connect LAN cable and I/O cable to MPS08B of the first MPS08B.

(5)Connect junction cables, junction boxes and pressure sensors

Connect junction cables, junction boxes and pressure sensors to each MPS08B.

(6)Connect the power supply

Connect the supplied AC adaptor to the power jacks of each MPS08B.

Make sure that all devices is connected and turn ON the power.

●When expanding, each MPS08B must be powered by AC adaptor.

8-3-3. Software setting for expansion

Settings on the measurement software are not required.

If you are expanding the system at the same time as a new installation, first install the software and set the network settings.

Refer to "2-3. Network Settings" (page 19) to complete the network settings.

After starting the measurement software, set the expansion mode of each amplifier.

(8-3-4. MPS08B settings for extension)

8-3-4. MPS08B settings for expansion

For expansion, the mode and IP address of each amplifier must be set individually.

●All connected MPS08B must have the same IP addressing.

The following is an example of setting. (Default IP address. Set by 192.168.2.3.)

<mode> <IP address>

First unit : MASTER 192.168.2.3

Second unit : SLAVE1 192.168.2.3

Third unit : SLAVE2 192.168.2.3

Fourth unit: SLAVE3 192.168.2.3

(1)Checking the mode

Check whether it is set to MASTER or SLAVE on the amplifier startup window.

※Updated from the software version shown above, the current version is "Ver:1.2.0.0".

(2)Switching modes

Switches MASTER ⇔SLAVE.

① ↓ Press once to enter IP Address Setting window.

② → Press the key once, and "MASTER (or SLAVE)" will blink.

③ Press ↑ or ↓ to switch MASTER ⇔SLAVE.

④ SET Confirm with the key.

⑤ Restart MPS08B. Turn the power off and then on again.

・Set to MASTER

・Set to SLAVE1

8-3-5. Communication check

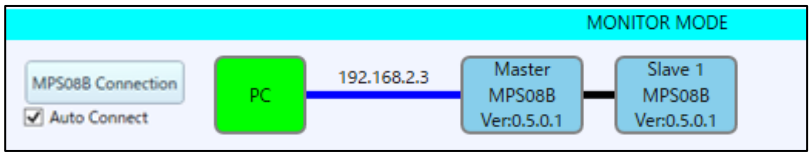
Checks that up to four MPS08B are recognized correctly.

(1) Turn ON all MPS08B

(2) Start the software on PC and check the system configuration indicators in the upper left of the screen.

The currently recognized MPS08B is displayed in blue.

・When two MPS08B are connected



※Updated from the software version shown above, the current version is "Ver:1.2.0.0".

●If you have an extended connection but only the first one is recognized, there is a problem with the connection.

Perform the following steps to reconfirm the connection:

① Exit the software

② Turn OFF all MPS08B.

③ Refer to "8-3-1 Extended Configuration Diagram" (P.88) and check whether the devices are connected correctly.

④ Turn ON all MPS08B and start the software.

⑤ Refer to "2-3 Network Settings" (page 19) and check if the IP address of the MPS08 for the master is set correctly.

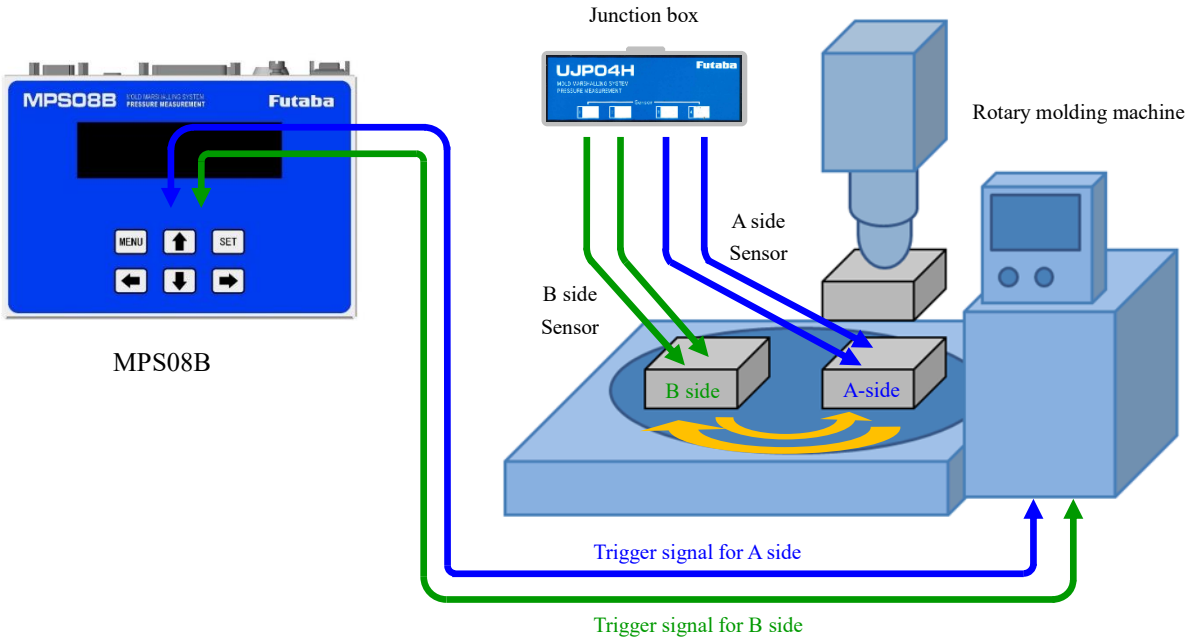
⑥ Refer to "8-3-4 MPS08B settings for expansions" (P.90) to check whether the "Modes" and "IP Addresses" of the extended MPS08B are set correctly.

After checking everything, turn on the power again and confirm that it is correctly recognized by the system configuration indicator in the software. If it is still not recognized correctly, there may be a problem with the device.

Please contact "Contact Us" on the back cover of this manual.

8-4. Use in rotary molding

8-4-1 System configuration



MPS08B

8-4-2 Sensor settings in the setting file

Set CH1 to 4 as A side and CH5 to 8 as B side.

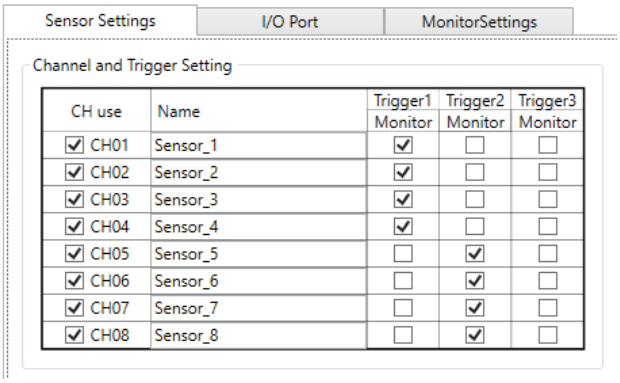
●This is an example of a 4-cavity setup for A side and a 4-cavity setup for B side.

(1)Setting → System → Sensor settings

→Channel Trigger Settings

Check Trigger 1 of CH1～CH4.

Check Trigger 2 on CH5～CH8.



(2)Settings → Module → I/O port

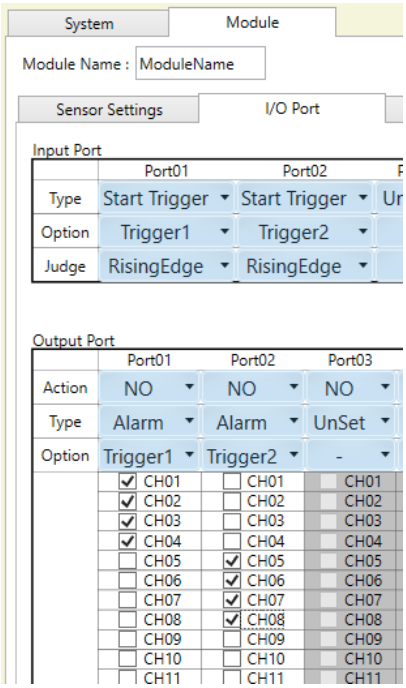
Set the trigger to start trigger 1 on the input Port01.

Set the trigger to start trigger 2 on the input Port02.

(3)To set an alarm

Sets the trigger 1 alarm for outputting Port01.

Sets the trigger 2 alarm for outputting Port02.



8-4-3 Waveform data and log data

The file names to be saved are as follows.

Log file: Configuration file name_ YYYYMMDD.csv

Waveform file: Configuration file name_YYYYMMDD_HHMMSS_shotNo.csv

9.MT method

9-1. Setting of MT Monitoring

MT method is based on the Mahalanobis distance (D-value), which converts multivariate information into one-dimensional information called distance, and judges normal/ abnormal. Normal populations are called "unit spaces" and are used as judgment criteria.

In the design of unit space, the normal waveform file confirmed in advance is stored in the folder for unit space design, and the value of the point divided by the specified time or the integral value divided by the specified time is extracted as an item.

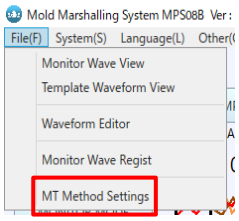
The average value, standard deviation, correlation coefficient, and threshold value of the unit space are transferred to the amplifier, and the square value (MD) of the Mahalanobis distance is calculated from the waveform data measured by the amplifier side. Then, the value is compared with the threshold value and judged. MD used for the judgment is displayed on the measurement display. The "Item Diagnostic" function is also installed to display the items that caused the abnormality for the data judged to be abnormal.

Setting of MT Monitoring

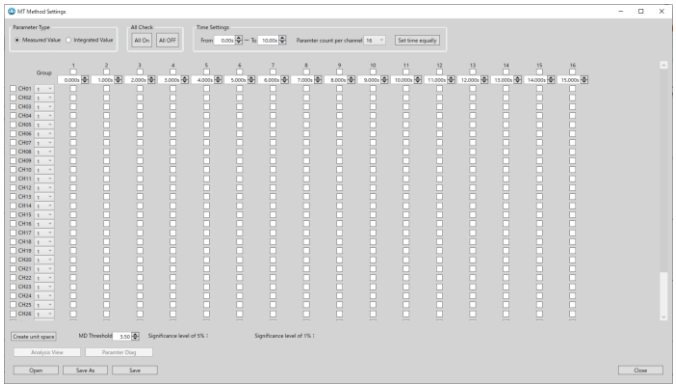
This section describes how to set up basic setting of MT monitoring.

9-1-1 Indication of MT method monitoring setting

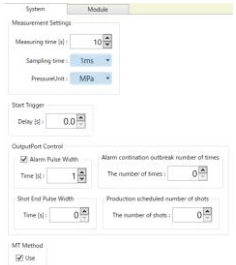
Press "File" → "MT Method settings" on the upper left of the screen to go to MT method setting screen.



MT Monitor Setting window will appear as shown below.

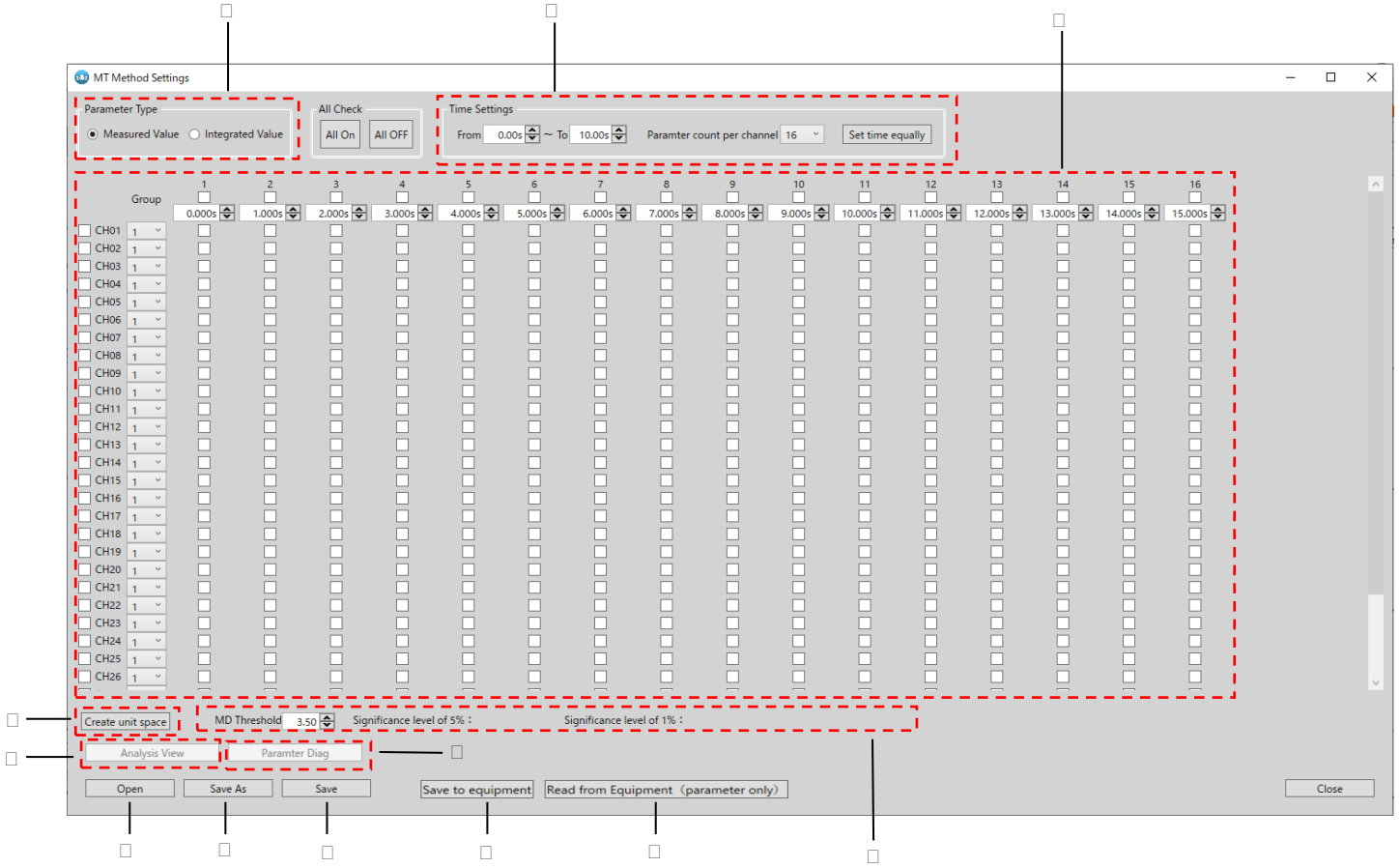


To use the MT method, go to "Settings" > "System" and check the MT method box.



9-1-2 Names and Functions of Display Parts

This section describes the basic screen. In this section, please memorize the contents and overview of each part of the screen.



□	Parameter Type	Select one of two methods for calculating MD: Pressure/Integral.
□	Time Settings	Used to set the time of an item in equal divisions.
□	Item Settings	Set channel enable/disable, group setting, time setting, and enable/disable for each item.
□	Create unit space	Calculate the unit space.
□	Analysis View	Display the analysis result of unit space data.
□	Parameter Diag	Display the unit analysis of the waveform data in the file in which the selected arbitrary waveform data is stored.
□	MD Threshold	Set the thresholds used for monitoring MT method. The significance level 5% and 1% of MD value as a guide are displayed after analyzing the units.
□	Open	Refer to the saved MT method setting file from the folder.
□	Save As	Save the created MT method setting file.
□	Save	Save the open MT method setting file.
□	Save to equipment	Save the present setting file to MPS08B.
□	Read from equipment	Display the parameters saved in MPS08B.

9-1-3 Parameter type setting

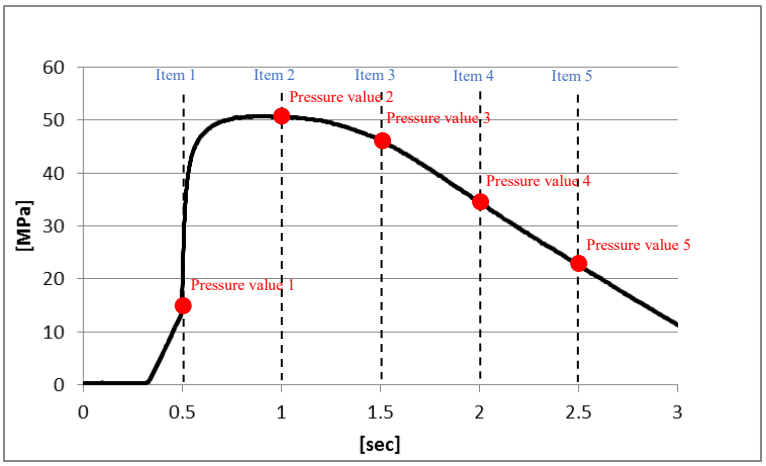
This section describes the parameter types used to calculate MD.

There are two types of parameters: pressure value and integral value. Select either one if necessary.

●Pressure value

Set the pressure value for the specified time as an item.

Used to monitor specific time variations in the waveform.

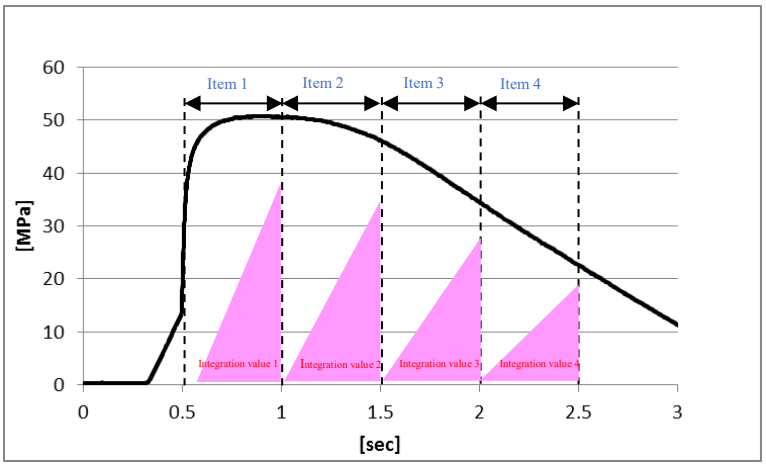


●Integral value

Set the integral value of the specified time range as an item.

Used to monitor changes in the entire specified time range of the waveform.

Integral value = pressure x time (calculated assuming that the start position of each region is 0)

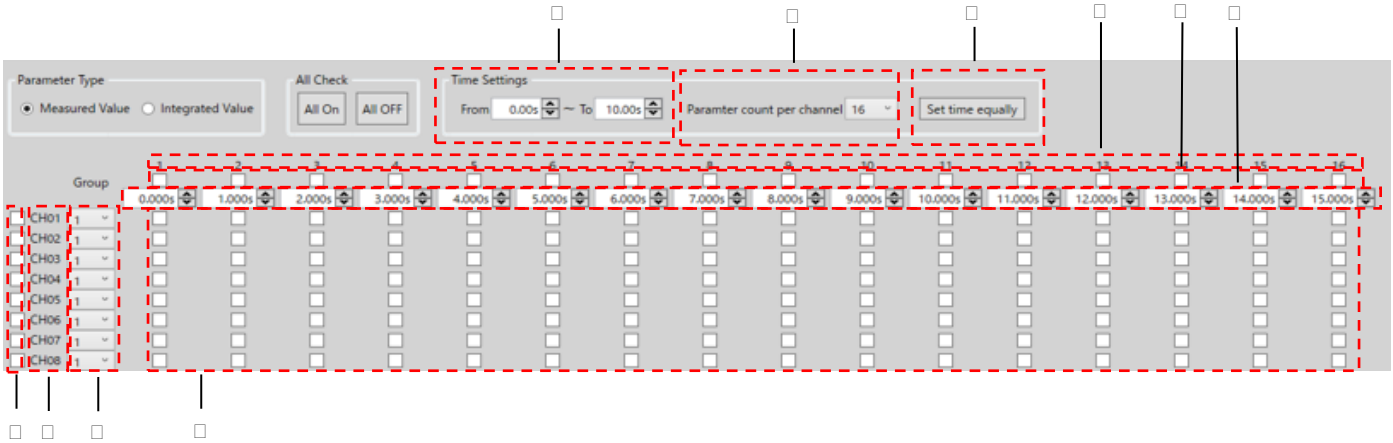


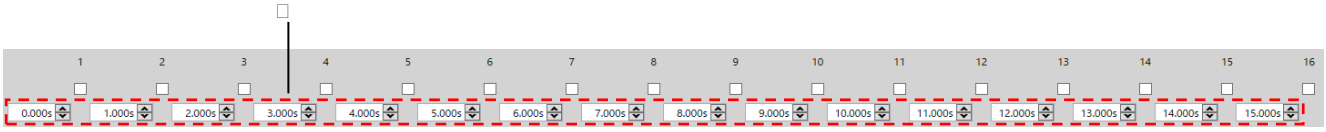
9-1-4 Item setting screen

This section describes how to set items.

9-1-4-1 Item setting screen

This section explains the item setting screen.





□	Time Settings	Enter the start and end time for equalization.
□	Parameter count per channel	Select the number of division items per channel for equal division, from 1 to 16 for the pressure value and from 1 to 15 for the integral value.
□	Set time equally	When pressing, set the equalization time.
□	Item number	Item number from 1 to 16.
□	Enable setting by item	When checked all channels for each item are checked and enabled.
□	Item time setting (pressure value)	Enter the set time of each item when setting the pressure value.
□	Item time setting (Integral value)	Enter the start time and end time of the setting time range of each item when the integral value is set.
□	Enable setting by channel	When checked all channels for each item are checked and enabled.
□	Channel number	Channel number from 1 to 32.
□	Group setting	Selects a group for each channel when grouping is used.
□	Enable setting by item, channel	Used to enable/disable each channel or item.

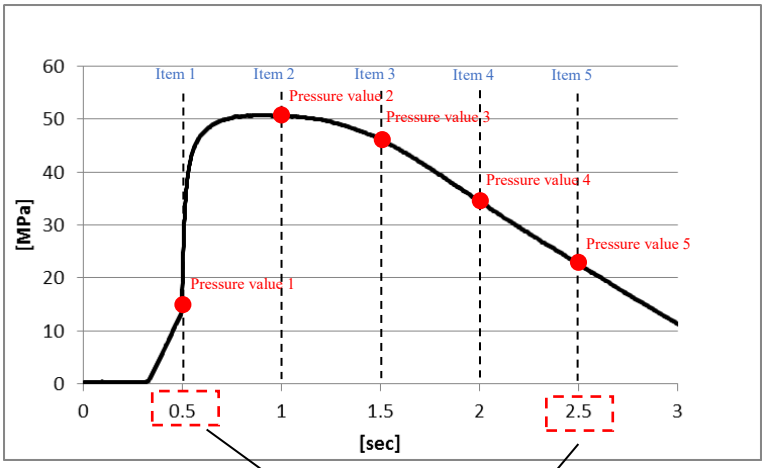
9-1-4-2 Time settings

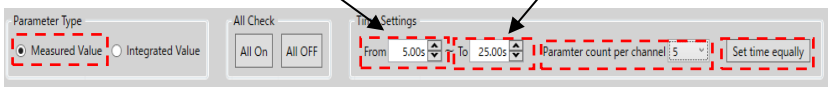
There are two types of time setting of items: equal rate setting and arbitrary setting. Choose either required.

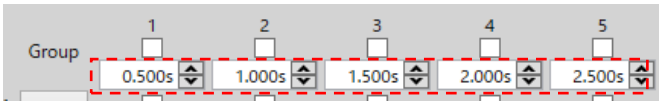
●Set time equally

Used to divide a specified range of times evenly by the number of items.

□For pressure values







* As shown in the figure on the left, if you would like to set the items in 5 equal divisions of 0.5 to 2.5 seconds at 0.5-second intervals, the following is what you would get.

*Check "Pressure value"

→Select 5 for "Parameter count per channel"

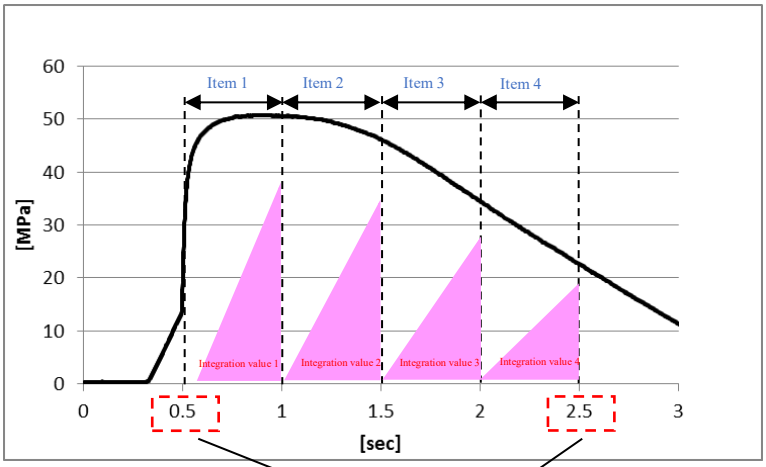
→Enter 0.5 for "From"

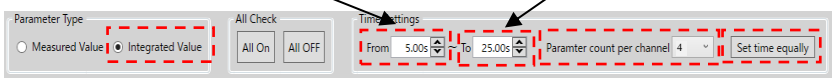
→Enter 2.5 for "To"

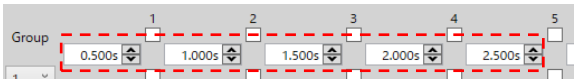
→Press the "Set time equally"

→Automatically divided

□For integral value







* As shown in the figure on the left, if you would like to set the items in 4 equal divisions of 0.5 to 2.5 seconds at 0.5-second intervals, the following is what you would get.

*Check "Integrated value"

→Select 4 for "Parameter count per channel"

→Enter 0.5 for "From"

→Enter 2.5 for "To"

→Press the "Set time equally"

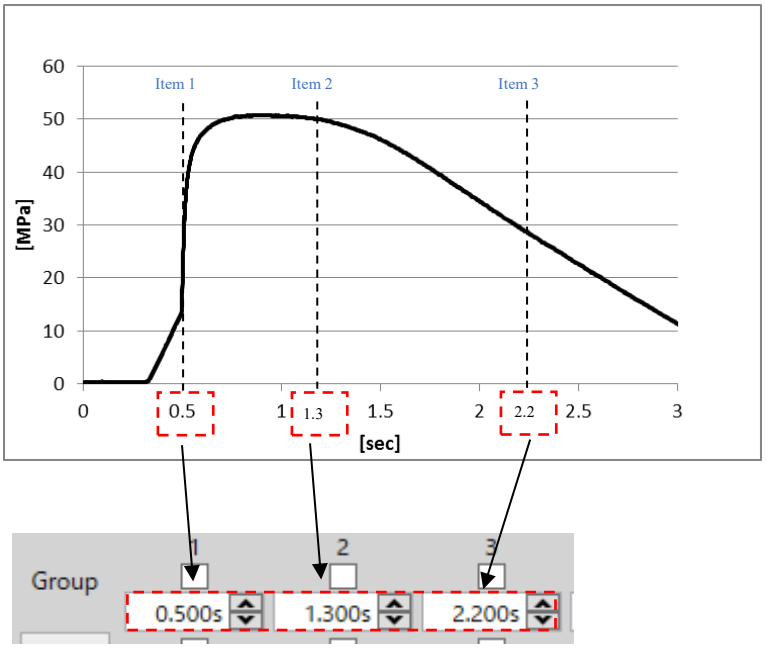
→Automatically divided"

●Arbitrary time setting

This section explains how to set the time arbitrarily for each item.

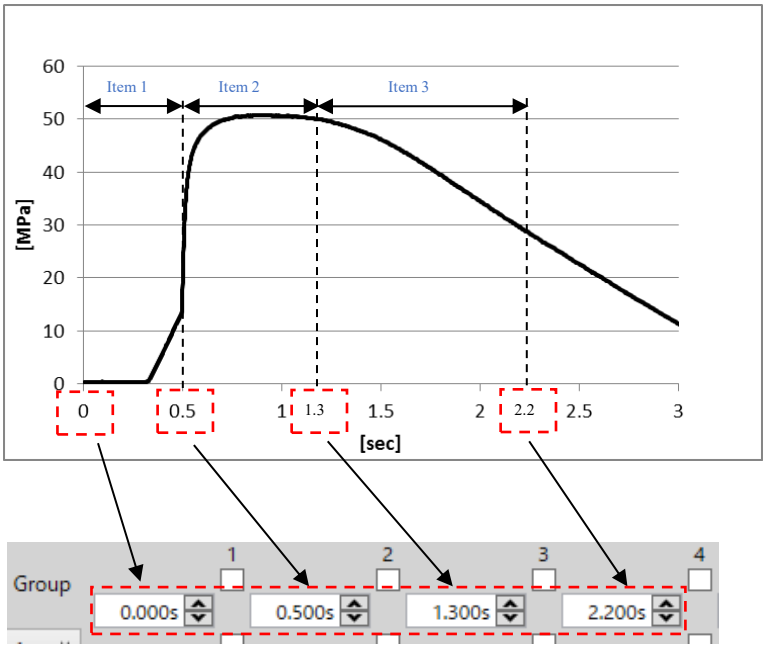
□For pressure value

To arbitrarily set the time when setting a pressure value, enter the time you would like to measure in the time input column of the item number as shown below.



□For integral value

To arbitrarily set the time when setting the integral value, enter the start time of the item range on the left side of the column of item numbers and the end time on the right side, as shown below.

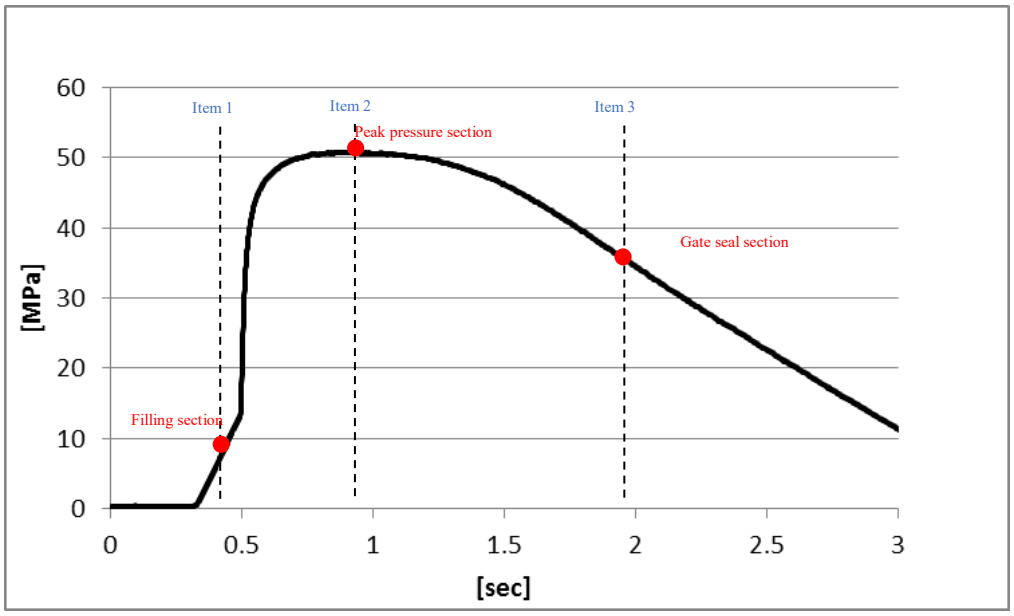


●Typical example of setting item

This section describes the typical setting items.

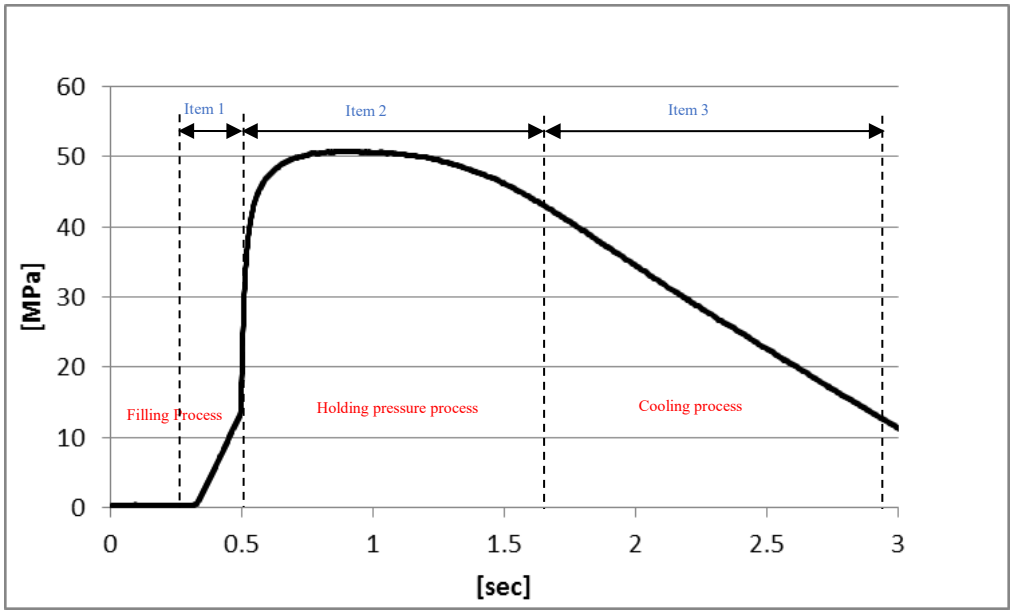
□For pressure value

Setting items in the filling section, peak pressure section, gate seal section, etc. makes it easier to identify the location and cause of the error.



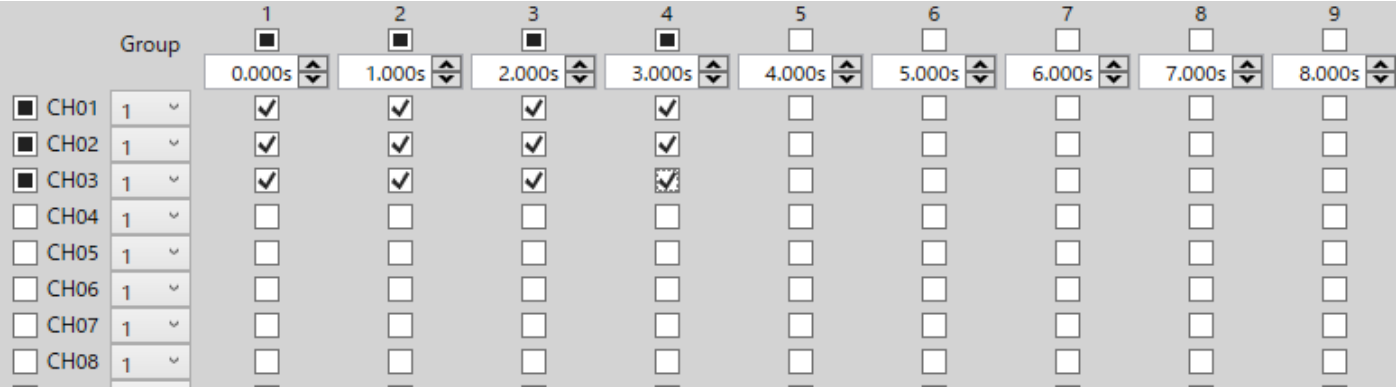
□For integral value

Setting items for each process, such as the filling process, holding pressure process, and cooling process, makes it easy to identify the locations of abnormalities and factors.



9-1-4-3 Item enable/disable setting

Up to 16 items and up to 32 channels can be selected. You can switch between enabled and disabled by checking the checkboxes of each channel and item.

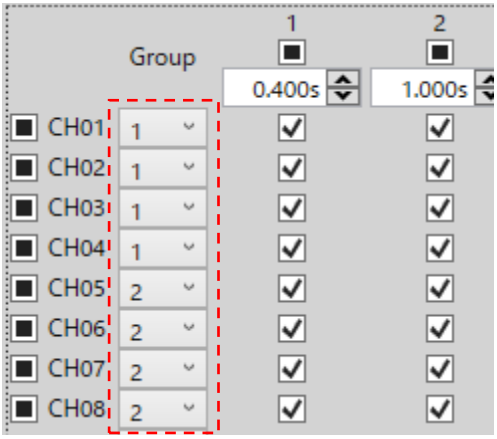


※The figure above shows the setting when 3 channels and 4 items are enabled.

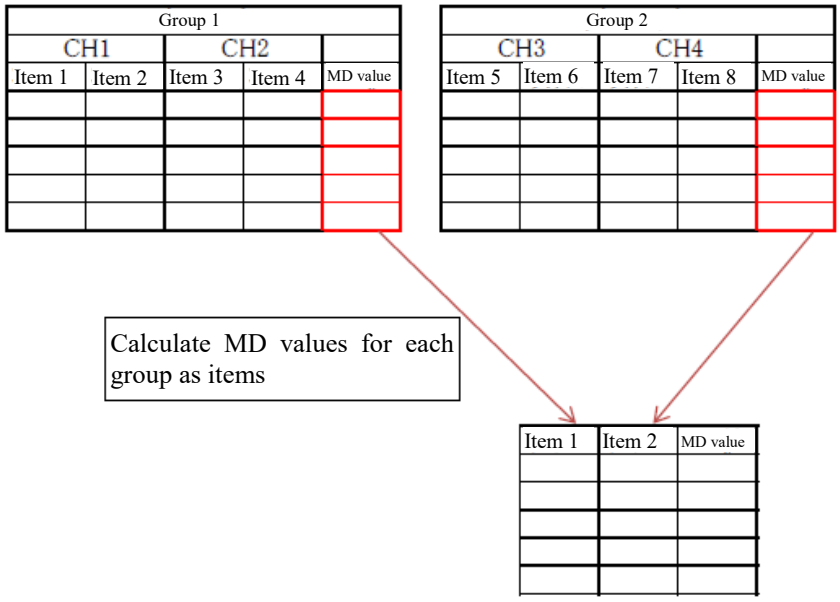
9-1-4-4 Group setting

Used for grouping and processing when there are a large number of channels or when many channels are to be processed. Use as needed.

■Select the group to which each channel belongs.



■The MD value is calculated for each group, and the final MD value is calculated using the MD value as the item.



9-1-5 Create unit space

This section describes Create unit space and MD Threshold setting.

9-1-5-1 Create unit space

Calculates MD values for unit space data, which is the basis for the monitoring judgment.

The setting of 9-1-1~ 9-1-4 must be completed. Check it before calculation.

●Calculation of MD of unit-space data

Press the "Create unit space" .

Calculate MD values for waveform data stored in the folder dedicated to unit space design, and calculate threshold values at 5% and 1% significance levels.

※The significance level is the standard probability for determining that an event is statistically unlikely to occur by chance (significant). Normally, 5% (0.05) is used, and 1% (0.01) is used when strictness is required.

※If the number of waveform data is insufficient or the measurement point is inappropriate, an error message will be displayed, so make adjustments by adding waveform data or changing the number of items or time settings.

※Unit space waveform Required minimum number of shots = number of channels (number of sensors) x number of items x3

9-1-5-2 Setting of MD Threshold

Set the threshold used to monitor MD value.

※Enter a significance level of 1% or 5% on the right or a value slightly larger than the maximum MD value in the analysis data display.

This completes the initial setup, so click “Save As” or “Save” at the bottom of the screen to save the settings. Threshold settings are saved and linked to the MPS08B condition setting file (~.xml).

9-2. Let's use it actually

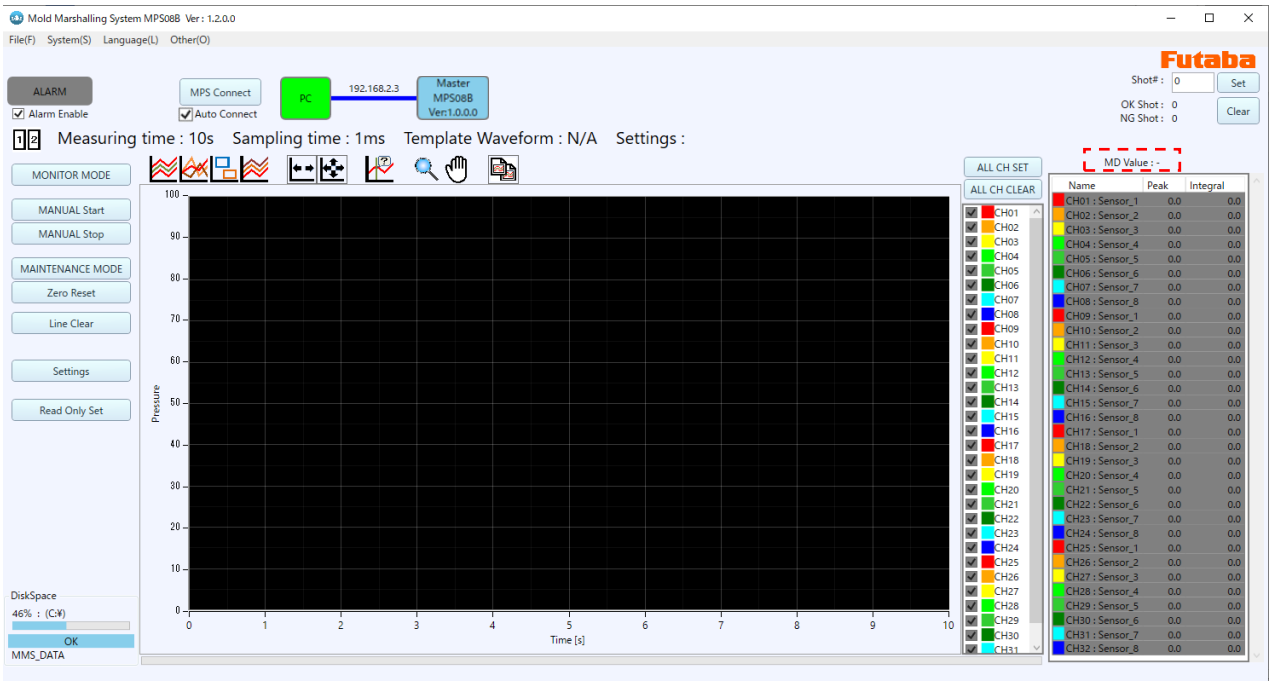
With the previous operations, all preparations for MT method monitoring settings are complete; now that all settings other than MT method have been made, actual molding is performed to verify the validity of the MT method.

9-2-1 Start measurement

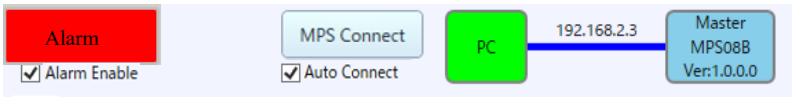
When a trigger signal (measurement start signal) from the molding machine is input, measurement of the pressure waveform starts.

●Display MD value

After the measurement is completed for each shot, the MD value is displayed in the upper right corner of the screen.

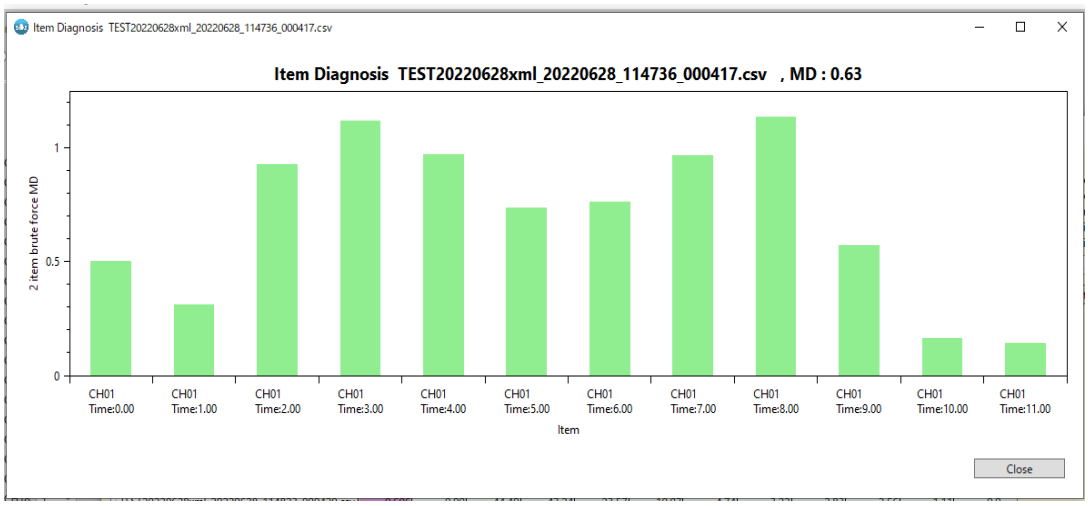


●If the MD value is above the set threshold, NG is indicated, the alarm lights up red, and the item diagnosis is displayed.



※Updated from the software version shown above, the current version is "Ver:1.2.0.0".

*Item diagnosis is displayed at the end of measurement, and automatically closes at the start of the next measurement. (Refer to 3-3 for details.)



9-2-2 Validation

Actual molding is performed to confirm the validity of the settings.

●When NG judgment occurs

When MT method monitoring NG judgment occurs, it is checked whether it is a defective product. If it is a non-defective product, the waveform data is added to the folder for unit space design, and the unit space design is recalculated.

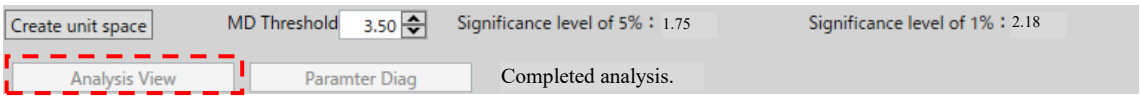
By repeating this operation, the reliability of the judgment is improved.

9-2-3 Item diagnosis

Item diagnosis is a function to analyze the items that caused the abnormality for the data judged to be abnormal. When NG is judged, it is displayed automatically, but it can also be checked later.

This section explains how to check later.

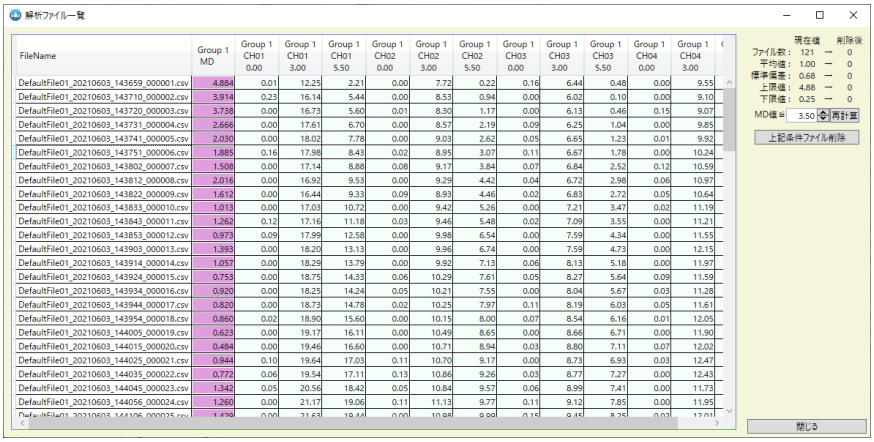
●Press "Analysis View" in MT method monitor setting.



※The unit space setting must be the same as the unit space setting of the waveform data to be diagnosed. If they are different, an error message is displayed.

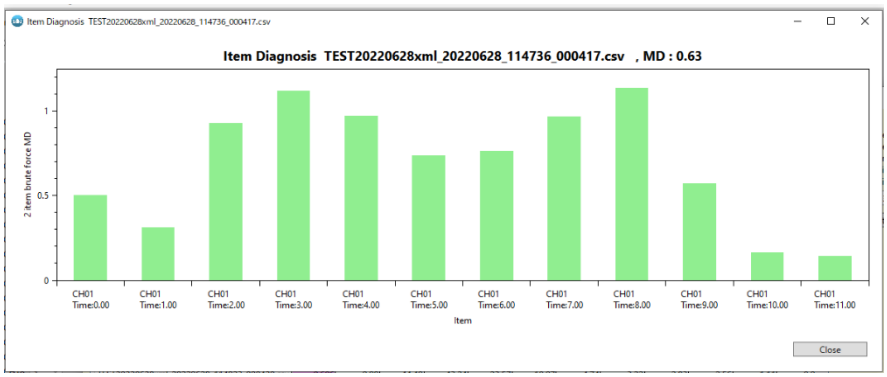
●Selecting a waveform file

The "Signal Space Data List" is displayed. Select the waveform data to be used for item diagnosis.



●Item diagnosis result display

The item diagnosis result of the selected waveform data is displayed.



※MD value per unit of two items is displayed graphically. The larger the value, the greater the cause of the error.

9-3. Function Description

9-3-1 Setting the Storage Location

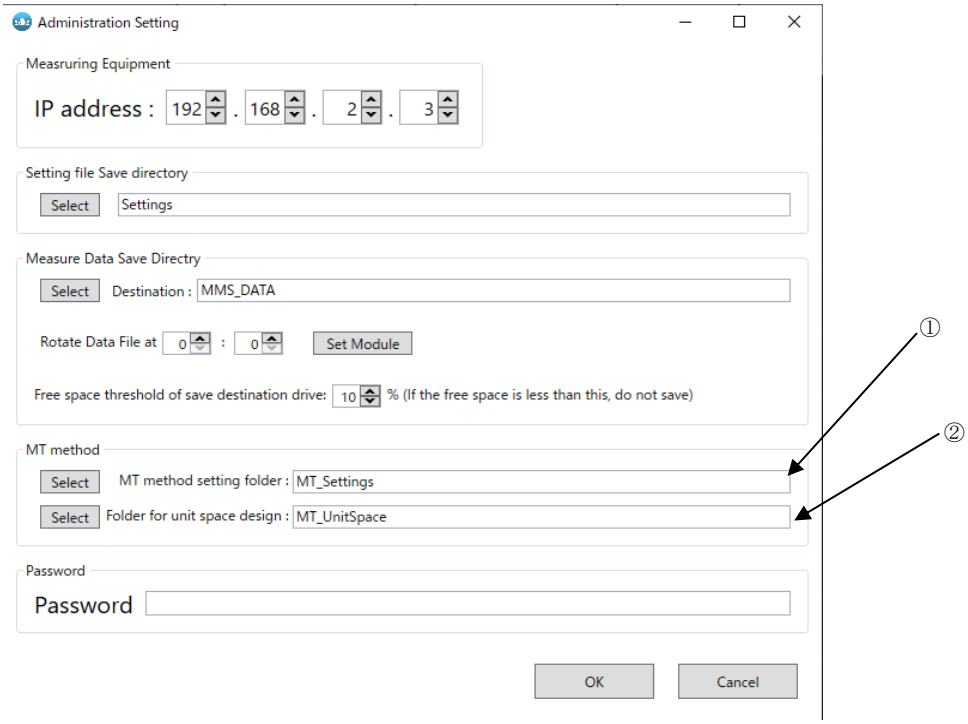
The saved data is saved in the folder specified in advance.

※For details on setting the save destination, see "4-3-2 Administration Setting".

9-3-2 Administration Setting

Perform "System"-> "Administration Setting" from the main menu. The Administration Settings screen is displayed.

In the Administration Setting window, you can set IP settings of MPS08B and the settings of various storage locations (storage paths).



No.	Name	Function
①	MT method setting folder	・Set the setting folder path to be used in MT method monitor setting display. ・The default settings are as follows: MT_Settings
②	Folder for unit space design	・Set the folder-path for unit-space designs to be used in MT method monitoring setting window. ・The default settings are as follows: MT_UnitSpace

10.Trouble shooting

10-1. Trouble shooting

If a problem occurs while using the MPS08B, take the following measures according to the symptoms.

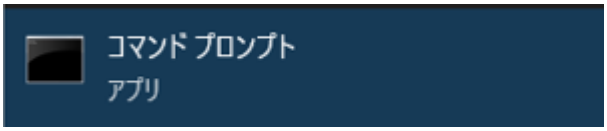
(1)MPS08B and PC cannot communicate

Probable Causes	Countermeasures
PC side IP address is not set.	Changes IP address of PC to the specified fixed value. To communicate with the default setting MPS08B, set IP adress of PC to 192.168.2.200. >> P.18 "Installing the Software"
PC is not able to recognize MPS08B.	Turn on the power of MPS08B amplifier alone and connect it to PC with LAN cable after starting up normally. >> P.18 "Installing the Software"
The operation mode is set to SLAVE mode.	Switches MPS08B display from SLAVE mode to MASTER mode. Then, turn off MPS08B, wait for about 10 seconds, and turn it on again. >> P.25 "Operating the Amplifier (MPS08B)"
The firewall is enabled.	Disable the firewall setting of the connected PC. If antivirus software is installed separately, the firewall may be set separately from Windows.
LAN cable is not specified.	Use the LAN cable supplied with the product. It is equivalent to a common CAT5 straight cable if only communication is used.

■Checking Communication Between PC～MPS08B at the Command Prompt

If communication between PC and MPS08B is not established, please also try the following procedure.

1. Start Command Prompt from the Windows Start Menu.



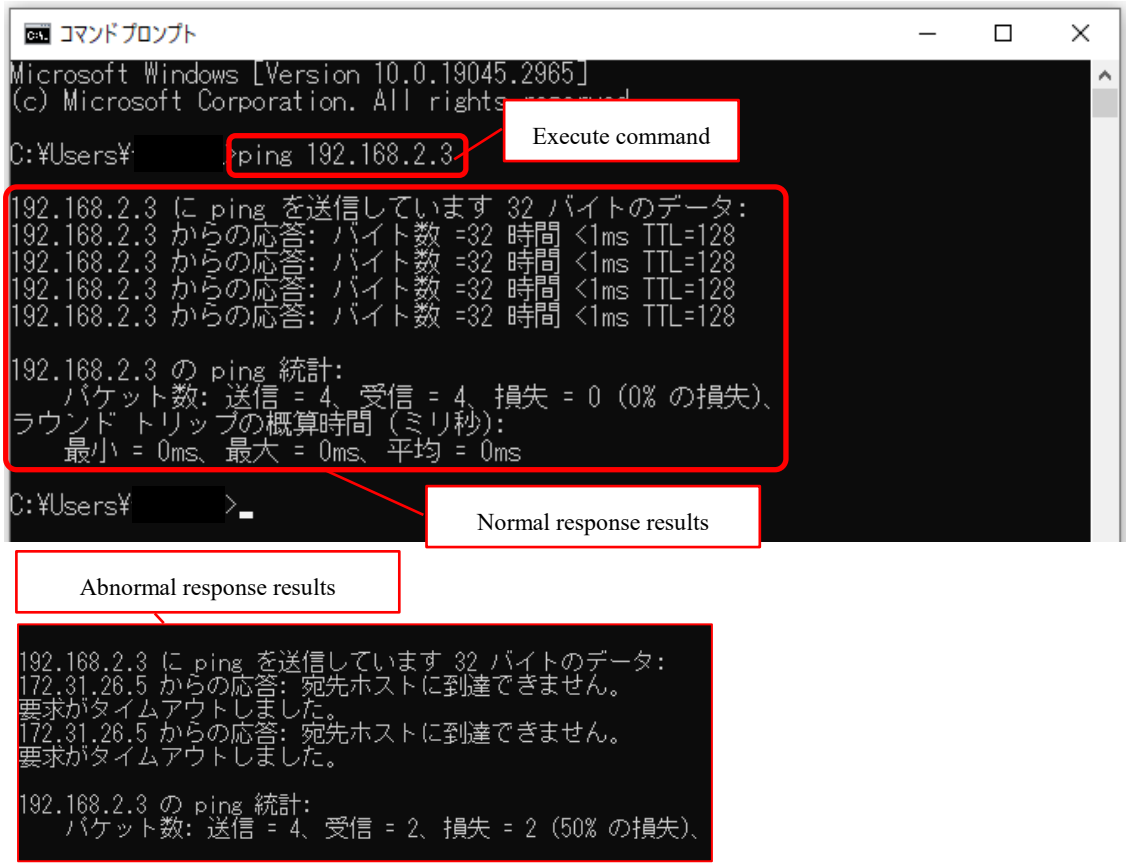
※You can search by typing cmd in the search bar next to Windows Start menu.

2. Execute the following command at the command prompt to confirm the response.

"Checking Communication Between MPS08B～PC"

Command: ping 192.168.2.3

※If the IP address on the MPS08B side has been changed, please execute the command with the changed IP address after the ping.

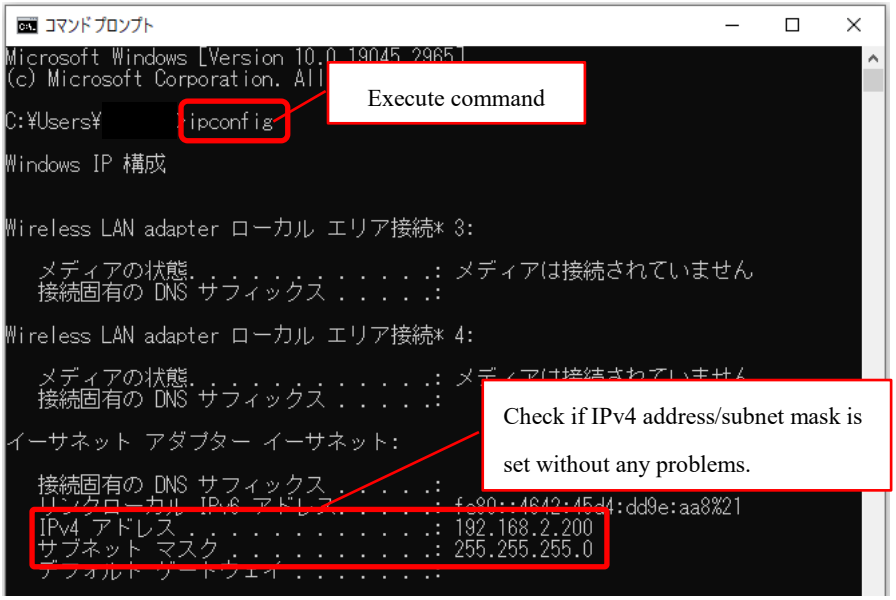


Abnormal response results

※If the response is normal but communication between the PC and the MPS08B is not established, the cause may be a firewall or anti-virus software.

"Checking IP Addressing Settings"

Command: ipconfig



※If the settings are incorrect, go to P.19 "2-3. Network settings".

(2)Measurement does not start.

Probable Causes	Countermeasures
Trigger signal is not input.	Check if the trigger signal is input correctly. Usually connect the mold close signal. Electrically, input a non-voltage contact signal. >> P.48 "I/O signal setting"
Maintenance mode is set.	Perform measurement in monitor mode. >> P.57 "Starting Measurement (Monitor Mode)"

(3) Abnormal measurements

Symptoms	Probable Causes	Countermeasures
The value is wrong.	Sensitivity classification of the sensor is not input.	Enter the sensitivity classification indicated on the sensor for each CH. To correct the characteristics of each sensor, the sensitivity classification must be set individually. >> P.47 "Setting Measurement Conditions"
	Sensitivity of the sensor is incorrect.	
	Trigger input timing is wrong	Make sure that the clamp complete signal is at the trigger input timing. >> P.48 "I/O signal setting"
	The trigger signal is input with a load applied to the sensor.	Make sure that the load is not applied to the sensor when a trigger is input.
Noise is generated.	The rated capacity is too large for the pressure sensor button type.	Change to a sensor with a smaller rated capacity that matches the measured value.
	The ground is not connected properly.	Connect the ground correctly. If grounding is not connected, ground the ground terminal on the MPS08B enclosure and see if the symptoms improve. >> P.15 "Connecting the Power Supply"
	The connection is not correct.	Check that each part is connected correctly. >> P.10 "Connecting the Pressure-Sensor and Each Cable"
Pressure of measured waveform does not become zero.	Shrinkage of the molded product stopped while the pin of the pressure receiving area was pushed in by the resin pressure.	This is not a particularly abnormal phenomenon.

(4) Abnormal analog voltage output

Symptoms	Probable Causes	Countermeasures
Analog voltage output is not working	D/A output disabled" is checked on the "Settings" screen of the PPSB. Or "DA:OFF" is selected in the voltage output on/off screen of MPS08B.	Uncheck "D/A output-disable". >> P.47 "Setting Measurement Conditions"
	Trigger signal is not input.	Check the connection destination so that the mold close signal is at the timing of the trigger input. >> P.48 "I/O Signal Setting"
Analog voltage change stops in the middle.	The analog voltage outputs the voltage corresponding to the measured value during the period from the input of the trigger signal to the lapse of the set measurement time. If the measurement is finished during the change, the voltage value at that point will continue to be held until the next trigger input.	It is impossible to continuously generate analog voltage while performing mass production molding and monitoring. If you would like to measure the overall analog voltage, set the measurement time to a value close to the molding cycle. Due to the file saving and communication, a certain amount of interval is required between the end of measurement and the input of the trigger signal. The interval varies depending on PC capacity, measurement time, and type of data to be saved. Check the setting while using the device.

(5) Initialization method

Initialization method

(1) Turn OFF the power with MPS08B unit.

(2) Turn ON MPS08B while pressing both the ↑ and ↓ keys.

(3) After the display panel lights up for about 20 seconds, the system shifts to normal startup.

This resets the factory default settings.

11.Specifications

11-1. General specifications

11-1-1. MPS 08 B Main unit

Number of points measured	4 points (Extended 8 points/unit: 1 junction box added) (Max. 32 points: When 4 units are connected)
Measuring range	0～200MPa
Precision	±2%F.S.
Sampling period	1ms/2ms/5ms/10ms/20ms/50ms/100ms/200ms/500ms/1000ms
Sampling time	Maximum 120 s/240 s/600 s/1200 s/2400 s/6000 s/ 12000s/24000s/60000s/120000s (sampling cycle order)
Control input	10 points: Contact input. (NPN open collector, PNP open collector switchable)
Control output	10 points: Photo relay (a-contact)
Analog output	0.0V～10.0V(20MPa/V) Impedance :100Ω
Internal storage data	100 setting files (written to non-volatile memory)
Ambient temperature	0～50℃
Ambient humidity	35～85%RH (non-condensing)
Vibration resistance	10-55Hz double-amplitude 1.5mm, 2 hours in X, Y, and Z directions
Warm-up time	Approx. 30 minutes
Power supply specifications	DC24V (Dedicated AC Adaptor, Input C100～240V) Maximum power consumption 10 W
Mass	About 1,150g

11-1-2. Heat-resistant junction-box UJP04H

Connected sensor	SS series or EPS series made by Futaba Corporation (EPS series. The optional adaptor is required.)
Operating temperature range	Mold temperature 120°C or less
Vibration resistance	10-55Hz double-amplitude 1.5mm, 2 hours in X, Y, and Z directions
Mass	About 150g

11-1-3. UCP04 Junction box with cable storage space

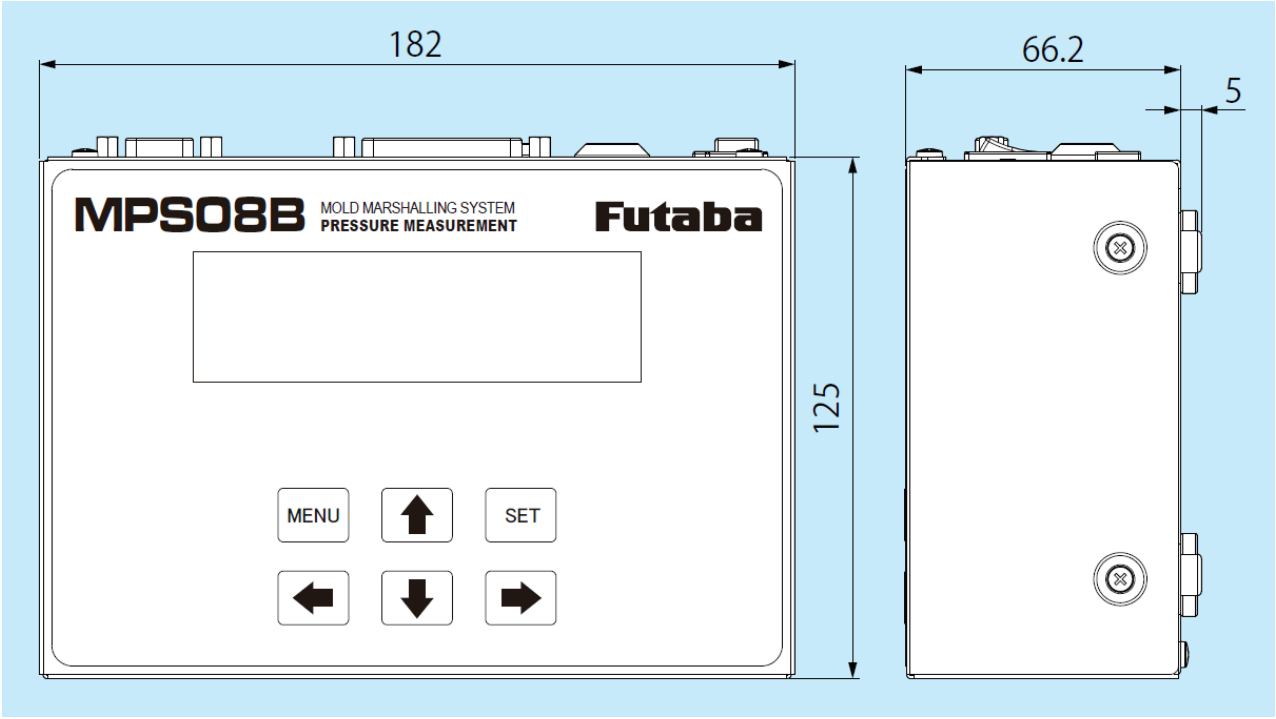
Connected sensor	SCB Series- Button Type for junction boxes with cable storage space by Futaba Corporation
Operating temperature range	Mold temperature 120°C or less
Vibration resistance	10-55Hz double-amplitude 1.5mm, 2 hours in X, Y, and Z directions
Mass	About 85g

11-1-4. Heat-resistant junction cable WJP0430HB

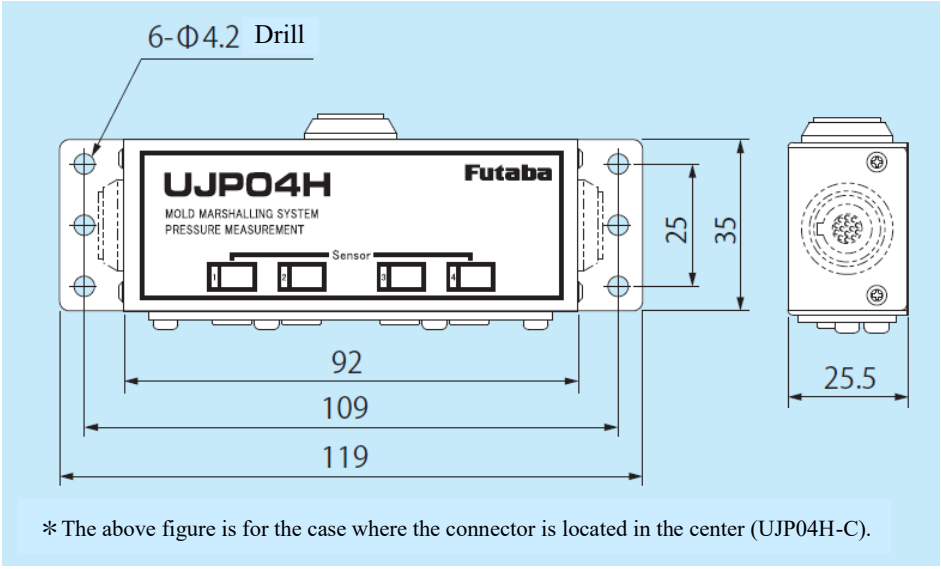
Overall length	3m
Operating temperature range	Mold temperature 105°C or less
Mass	About 160g

11-2. External Dimensions

11-2-1. Pressure-measuring amplifier MPS08B

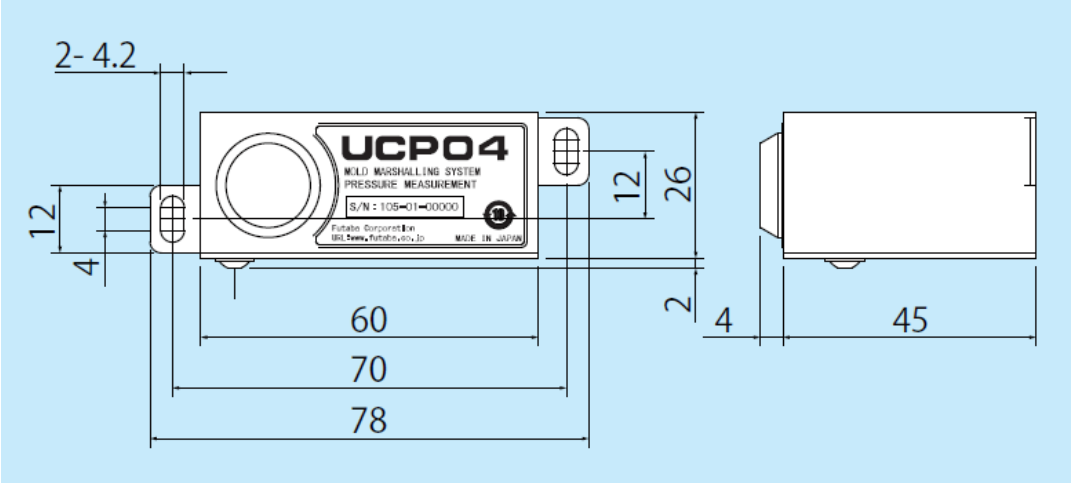


11-2-2. Heat-resistant junction-box UJP04H

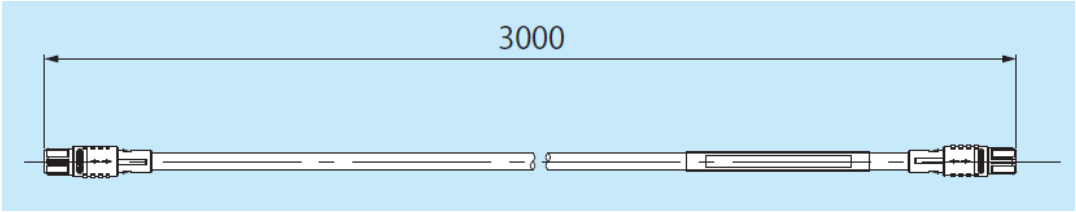


＊The above figure is for the case where the connector is located in the center (UJP04H-C).

11-2-3. UCP04 Junction box with cable storage space

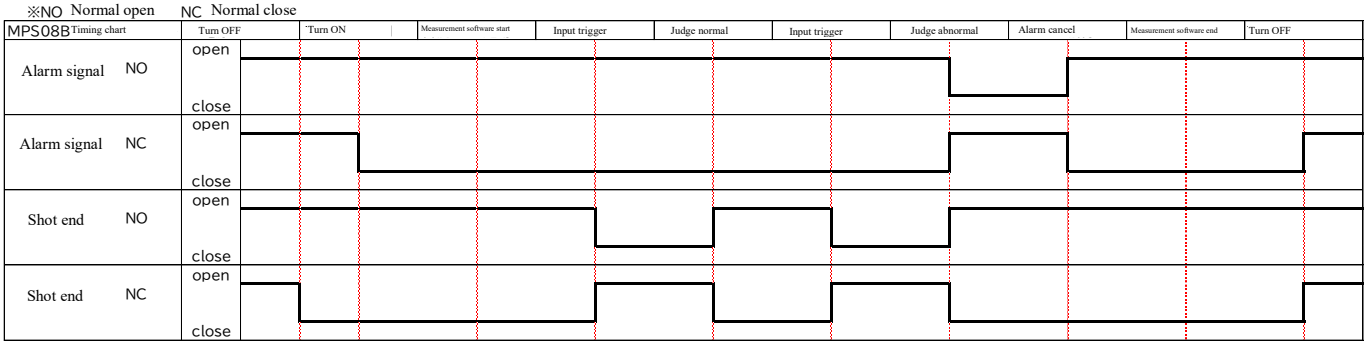


11-2-4. Heat-resistant relay cabling WJP0430HB



11-3. Timing chart

※NO Normal open NC Normal close



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