
**User's
Manual**

**10-CH, 100 kS/s Digitizer Module
WE7251**

**IM 707251-01E
3rd Edition**

Thank you for purchasing the 10-CH, 100 kS/s Digitizer Module WE7251 for the PC-based measurement instruments, WE7000.

This User's Manual contains useful information about the function, connection to the measuring station, and troubleshooting of the WE7251. This manual assumes that you will be using the WE7000 Control Software that is included with the measuring station.

For general information about the WE7000 (primarily the operations of the measuring station, the optical interface module, the optical interface card, and the WE7000 Control Software) see the following manual that is included with the measuring station.

Manual Title	Manual No.
WE7000 User's Manual	IM707001-01E

To ensure correct use, please read this manual thoroughly before operation. Keep this manual in a safe place for quick reference in the event a question arises.

Notes

- **The contents of this manual describe WE7000 Control Software Ver. 4.0.2.0 and module software Ver 3.05. If you are using another version of the software, the operating procedures or the figures given in this manual may differ from the actual software.**
- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer.
- Copying or reproducing any or all of the contents of this manual without YOKOGAWA's permission is strictly prohibited.

Trademarks

- Microsoft, Windows, and Windows NT are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- Adobe and Acrobat are trademarks of Adobe Systems Incorporated.
- Other product names are trademarks or registered trademarks of their respective holders.

Revisions

1st Edition: December 1998

2nd Edition: July 1999

3rd Edition: August 2000

Checking the Contents of the Package

Unpack the box and check the contents before operating the instrument. If the contents are not correct or missing or if there is physical damage, contact the dealer from which you purchased them.

Measurement Module

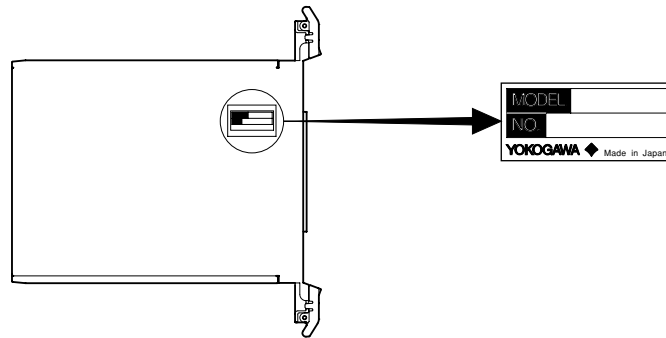
Check that the model name given on the name plate matches those on the order.

MODEL

Model	Suffix Code	Description
707251		WE7251 10-CH, 100 kS/s Digitizer Module
	/HE	English help message

NO.

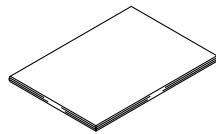
When contacting the dealer from which you purchased the instrument, please quote the instrument No.



Standard Accessories

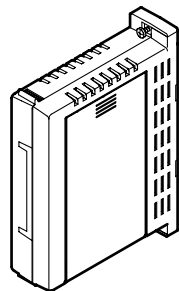
The following standard accessories are supplied with the instrument. Make sure that all items are present and undamaged.

User's Manual (1)
IM707251-01E



Optional Accessories (Sold Separately)

Name	Model	Description
Input terminal block	707821	Voltage input, clamp type terminal



How to Use This Manual

Structure of the Manual

This User's Manual consists of the following four chapters and an index.

Chapter Title	Description
1 Explanation of Functions	Explains the system configuration and functions.
2 Hardware Preparation	Explains how to install the module into the measuring station and how to connect the input.
3 Troubleshooting and Maintenance	Explains the procedures for troubleshooting and self testing.
4 Specifications	Explains the specifications of the module.
Index	Index of contents.

Conventions Used in This Manual

Unit

k Denotes 1000. Example: 100 kHz

K Denotes 1024. Example: 720 KB

Displayed characters

Alphanumeric characters enclosed with [] usually refer to characters or settings that are displayed on the screen.

Symbols

The following symbol marks are used to attract the operator's attention.



Affixed to the instrument. Indicates danger to personnel or to the instrument. The operator must refer to the User's Manual. The symbol is used in the User's Manual to indicate the reference.

WARNING

Describes precautions that should be observed to prevent injury or death to the user.

CAUTION

Describes precautions that should be observed to prevent minor or moderate injury, or damage to the instrument.

Note

Provides information that is important for operating the instrument properly.

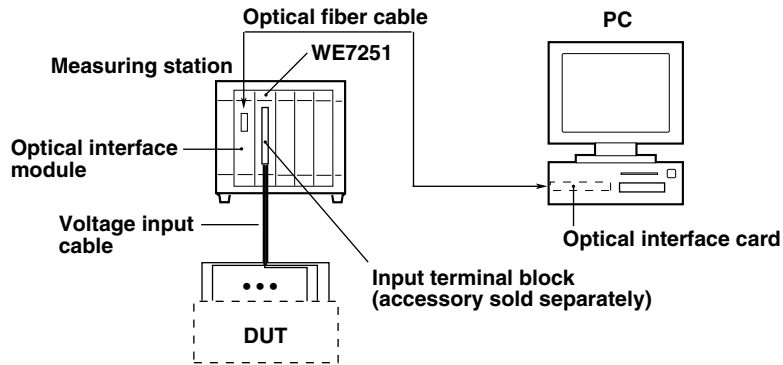
Contents

Checking the Contents of the Package	2
How to Use This Manual	3
Chapter 1 Explanation of Functions	
1.1 System Configuration and Block Diagram	1-1
1.2 Operation Panel	1-2
1.3 Setting the Conditions for Acquiring the Waveform	1-3
1.4 Setting the Trigger	1-6
1.5 Automatic Saving of the Waveform Data, File Format Conversion, and Other Settings	1-8
1.6 Synchronizing to Other Modules Using the Bus Trigger/Time Base Signal	1-10
1.7 Names and Functions of Sections	1-12
Chapter 2 Hardware Preparation	
△ 2.1 Installing the Module into the Measuring Station	2-1
△ 2.2 Connecting the Input Terminal Block and the Input Signal Wire	2-3
Chapter 3 Troubleshooting and Maintenance	
3.1 Troubleshooting	3-1
3.2 Self Test	3-2
3.3 Maintenance	3-3
Chapter 4 Specifications	
4.1 Performance Specifications	4-1
4.2 Default Values (Factory Default Settings)	4-3
4.3 General Specifications	4-4
4.4 Specifications of the Input Terminal Block	4-6
4.5 Dimensional Drawings	4-7
Index	Index-1

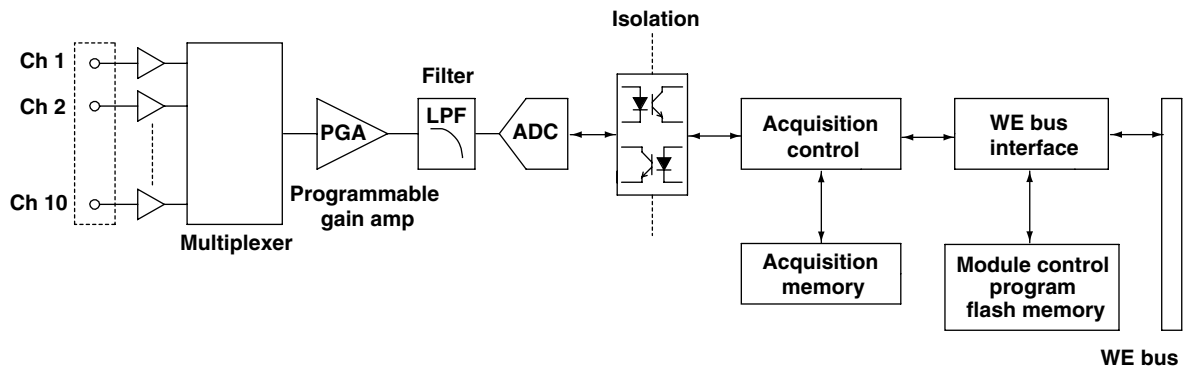
1.1 System Configuration and Block Diagram

System Configuration

The following is an example in which the 10-CH, 100 kS/s Digitizer Module WE7251 is installed into the measuring station and the measuring station is connected to the PC with the optical fiber cable.



Block Diagram



An input terminal block (sold separately) is connected to the input terminal of the digitizer module. The voltage input cables are connected to the 10 channels of clamp type terminals on the input terminal block.

The signal applied to the input terminal is scanned by the multiplexer and passed to the programmable gain amplifier where the amplitude of the signal is adjusted. Then, the signal enters the A/D converter. In the A/D converter, the input signal is sampled by synchronizing to the clock provided by the time base and converted to digital data. The digital data is then isolated by the photo coupler, and stored in the acquisition memory according to the sampling interval and the trigger condition settings.

The data in the acquisition memory can be read from a PC through the communication interface.

1.2 Operation Panel

The WE7000 Control Software that is installed in the PC is used to control the 10-CH, 100 kS/s Digitizer Module WE7251. The WE7000 Control Software displays operation panels similar to those shown in the figure below. This User's Manual does not explain the operations of the operation panel or waveform monitor. For the operations of these items, see the on-line help that is provided with the WE7000 Control Software.

Setting the conditions for acquiring the waveform

Turn measurement ON/OFF Select measurement range

Slot5	Trig	On	Data(V)	Range	Trig Type	Trig High(V)	Trig Low(V)
CH1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-0.002	1V	Both	0.00	0.00
CH2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-0.004	1V	High	0.00	0.00
CH3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0.002	1V	High	0.00	0.00
CH4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0.001	1V	In	0.00	0.00
CH5	<input type="checkbox"/>	<input type="checkbox"/>	0.000	20V	Out	0.0	0.0
CH6	<input type="checkbox"/>	<input type="checkbox"/>	0.000	20V	Off	0.0	0.0
CH7	<input type="checkbox"/>	<input type="checkbox"/>	0.000	20V	Off	0.0	0.0
CH8	<input type="checkbox"/>	<input type="checkbox"/>	0.000	20V	Off	0.0	0.0
CH9	<input type="checkbox"/>	<input type="checkbox"/>	0.000	20V	Off	0.0	0.0
CH10	<input type="checkbox"/>	<input type="checkbox"/>	0.000	20V	Off	0.0	0.0

Start/stop measurement
Turn waveform monitor ON/OFF
Check during continuous measurements (only during trigger mode)
Select acquisition method
Set sampling interval
Select number of memory partitions
Set the record length
Number of acquisitions (number of memory blocks used)
Turn the input filter ON/OFF

Setting the time base

Trig tab

Select time base

Setting the trigger

Trig tab

Select the trigger type

Select the trigger source
Select the trigger combination
Set the pretrigger
Set the trigger hold off

1.3 Setting the Conditions for Acquiring the Waveform

Measurement Range

You can select from the following measurement ranges.

Setting	Measurable Range (Accuracy Guaranteed Measurement Range)	Display Range	Display Resolution
1 V	-1 to 1 V	-1.000 to 1.000 V	1 mV
2 V	-2 to 2 V	-2.000 to 2.000 V	1 mV
5 V	-5 to 5 V	-5.000 to 5.000 V	1 mV
10 V	-10 to 10 V	-10.000 to 10.000 V	1 mV
20 V	-20 to 20 V	-20.000 to 20.000 V	1 mV

Acquisition Method (Acquisition Mode)

Select the measurement data acquisition method from the following three modes.

Trigger mode

The measurement data are acquired to the acquisition memory according to the specified trigger condition (see section 1.4). After acquiring the specified record length of data, the operation stops. In this mode, the acquisition memory can be partitioned and the measured data can be acquired to these individual memory blocks each time triggering occurs. If the [Repeat] check box* is selected, the operation repeats until the next time the [Start] button is clicked.

* [Repeat] check box appears only when the expression “actual number of memory partitions $\geq 2 \times$ number of measurements” is satisfied. The “optimal number of memory partitions” refers to the number of partitions that is used as a matter of convenience inside the module. In some cases, the memory can be partitioned into smaller sections depending on the record length and the number of channels. In such cases, the maximum possible number of partitions is determined, and this value is taken to be the “optimal number of memory partitions.”

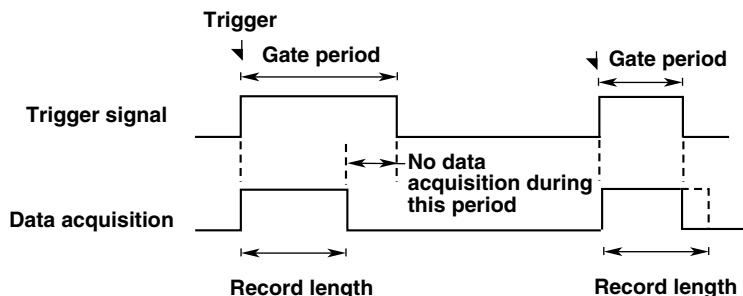
The actual number of memory partitions is the closest smaller number to 2^n when taking “ $1,048,576 / (\text{number of channels} \times \text{record length})$.” For example, if the calculation is “ $1,048,576 / (8 \times 1000) = 131.072$,” then the actual number of partitions is “128.” Thus, if the number of acquisitions is less than or equal to 64, the [Repeat] check box appears. If it is larger than 64, the check box does not appear. If the optimal value exceeds “256,” the number of partitions is set to “256.” Note that if the number of acquisitions [No. of Acquisitions] is set to “0,” then the [Repeat] check box does not appear.

Free run mode

Upon clicking the [Start] button, the measured data are acquired immediately to the acquisition memory. If the [Start] button is clicked again, the operation stops.

Gate mode

The measurement data are acquired during the time when the specified trigger condition is satisfied (gate period). If the specified record length of data is acquired before the gate period ends, the acquisition stops at that point. The operation repeats the number of times specified by the number of acquisitions. If you stop the measurement before this number is reached, the acquisition stops immediately.



Sampling Interval

During trigger/gate mode

You can select the sampling interval in the range from 10 μ s to 10 s (in 10 μ s steps). However, the minimum measurement period that can be selected is bounded by 10 μ s \times number of measurement channels (1 μ s \times number of measurement channels when the input filter is ON). Furthermore, if the modules are linked, the minimum sampling interval is 100 μ s regardless of the number of measurement channels.

During free run mode

You can select the sampling interval in the range from 1 ms to 10 s (in 10 μ s steps). However, if the input filter is ON, the minimum sampling interval that can be specified is 1 ms \times the number of measurement channels (10 ms when the modules are linked).

Memory Partition (Valid Only during Trigger Mode)

If you are using the trigger to acquire the measured data, you can partition the acquisition memory into several blocks and acquire the measured data into the individual memory blocks, in order, every time the triggering occurs. The memory can be partitioned into 1/2/4/8/16/32/64/128/256 partitions. When using memory partitions, if the measurement is stopped before reaching the number of acquisitions, the data in the memory block that was being written at that time are invalid.

Record Length (Valid Only during Trigger/Gate Mode)

The maximum record length (number of acquired data points) when the memory is not partitioned is 1,048,576 points (1 Mword)/number of measurement channels. The record length can be set in the range from 100 to (1,048,576/number of memory partitions) during the trigger mode. If acquiring the measured data repetitively in the trigger mode (the [Repeat] check box is selected), then the maximum number of points that can be selected is 524,288/(number of memory partitions \times number of channels). However, the maximum number of points that can be selected when the modules are linked is one-tenth of the maximum number when the modules are not linked.

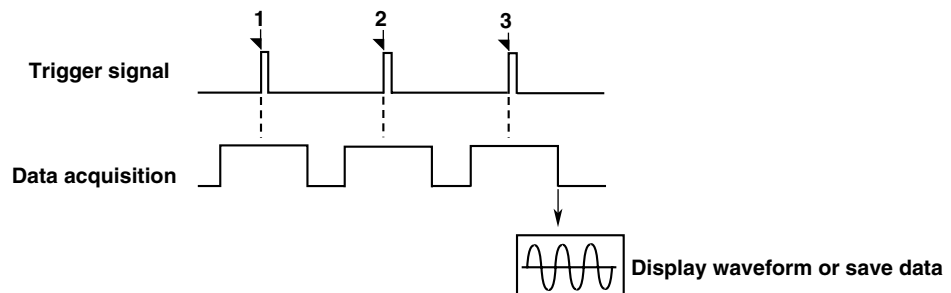
If the record length is set to 0 in the trigger mode, the record length becomes (1,048,576/number of measurement channels/number of memory partitions). If acquiring the measured data repetitively in the trigger mode (the [Repeat] check box is selected), then the maximum record length becomes (524,288/number of memory partitions).

If "0" is specified in the gate mode, the record length is determined by the amount of time the gate is open (asserted). Because the record length varies, in this case, the number of blocks of measured data that are saved varies depending on the gate's assertion duration and the sampling interval.

Number of Acquisitions (Valid Only during Trigger/Gate Mode)

When partitioning the memory to acquire the measured data in the trigger mode or when the acquisition method is set to gate mode, you can set the number of times to acquire the data. The range is 1 (0) to 32,768. If you set the number to 0, then the memory blocks are overwritten with the measurement data until the measurement is stopped.

After acquiring the number of acquisitions of data or if the acquisition is stopped, the waveform of the measured data is displayed. For example, if you set the number of acquisitions to "3" in the trigger mode, the module operates as follows.



If you set a number less than the number of memory partitions in the trigger mode, you will have to select the memory block number to use. If you set a number larger than the number of memory partitions, the memory blocks are overwritten with the measurement data until the specified number is reached.

In the gate mode, measured data are acquired by taking the specified record length to be one block. When the specified record length is 4,096 points (1 Mword/256) or less and the number of acquisitions is set to 256 or less, all of the acquired data are saved. But, if the number of acquisition is set above 256, the acquired data beyond the 256th acquisition overwrites the previous data starting from the first acquisition. If the record length is set above 4,096 points, the data are overwritten when the number of acquisitions exceeds (1 Mword/specified record length).

Note

If the number acquisition is greater than the number of memory partitions in the trigger mode, then the last (number of memory partitions) blocks of data are saved.

The following limitations exist for the gate mode

- If the specified record length is 524,288 points or more, you can only specify 1 for the number of acquisitions.
 - If (number of acquisitions × record length) is 1,048,576 points or less and the number of acquisitions exceeds 256, then only the last 256 blocks of measured data are saved.
 - If (number of acquisitions × record length) is greater than 1,048,576 points, then the last (1,048,576/record length) blocks of measured data are saved.
-

Time Base

You can select whether to sample the input signal with the specified sampling interval based on the module's internal clock or to sample with the time base signal [CMNCLK]* of the measuring station (BUSCLK setting).

* For setting procedures, see section 4.6, "Setting the Trigger Source/Time Base/Arming" in the WE7000 User's Manual (IM707001-01E).

Turning ON/OFF the Input Filter (Filter 1 kHz)

If you turn ON the input filter, high frequency noise over 1 kHz can be eliminated from the input signal.

1.4 Setting the Trigger

Trigger Source

Select the signal for triggering.

Internal: Input signal (includes input signals from 10-CH, 100 kS/s Digitizer Modules that are linked)

BUSTRG: Bus signal (BUSTRG1/(BUSTRG2) of the WE bus)

Trigger Type and Trigger Slope

When the trigger source is set to the input signal, you can select the trigger type from the following list of choices. Select [Off] if you do not want it to be a trigger source.

Rise/Fall/Both (Edge trigger)

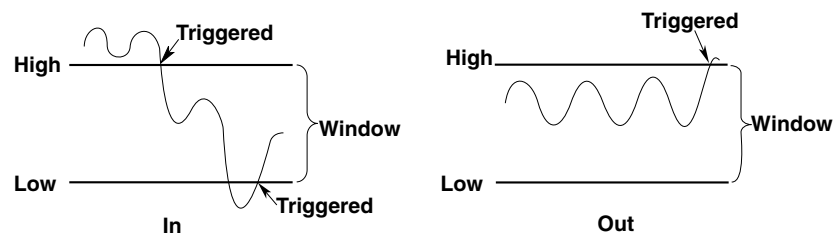
With this setting, the trigger occurs when the input signal changes from below the trigger level to above the trigger level (Rise) or from above the trigger level to below the trigger level (Fall). You can have the trigger occur on the rise or fall or both.

High/Low (State trigger)

With this setting, the trigger occurs when the input signal is above the specified trigger level (high) or below the trigger (Low) or when it enters the high or low condition.

In/Out (Window trigger)

With this setting, a voltage level interval (window) is created by specifying a Low level and a High level. The trigger occurs when the input signal enters the voltage interval (In) or when it leaves the voltage interval (Out).



Trigger Level (Trig High (V), Trig Low (V))

The procedure to set the trigger level differs depending on the trigger type that is selected. The selectable range of voltage is the measurable range determined by the measurement range. It is set for each channel. The resolution is 0.01 V for measurement ranges of $\pm 1/2/5$ V and 0.1 V for measurement ranges of $\pm 10/20$ V.

Trigger type: Rise/Fall/Both

Enter the value in the [Trig High (V)] box.

Trigger type: High/Low

Enter the values in the [Trig High (V)] box and the [Trig Low (V)] box.

Trigger type: In/Out

Enter the high level of the window in the [Trig High (V)] box and the low level in the [Trig Low (V)] entry box.

Trigger Combination

Select one of the following list of choices.

OR trigger

The trigger occurs if any one of the trigger conditions specified for the input signal of each channel is satisfied.

AND trigger

The trigger occurs when all of the trigger conditions specified for the input signal of each channel are satisfied.

Pretrigger (Valid Only during Trigger Mode)

You can acquire the measured data before the trigger point into the acquisition memory. Set how many points before the trigger point to begin the acquisition in the range, "0 to (specified record length – 2)."

Trigger Hold Off (Valid Only during Trigger Mode) and Overlap Acquisition Permission

Select the trigger hold-off period that is used to temporarily stop the detection of the next trigger once a trigger occurs. With the factory default settings, the detection of the next trigger does not occur until the measured data are stored in the acquisition memory (overlap acquisition disabled). Therefore, the hold-off period can be set in the range "record length to 1,048,576" (data points). By enabling overlap acquisition, the hold-off period can be set in the range "1 to 1,048,576."

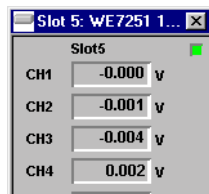
1.5 Automatic Saving of the Waveform Data, File Format Conversion, and Other Settings

The following functions are functions of the WE7000 Control Software.

For the operations of the following functions, see the on-line help that is provided with the WE7000 control Software.

Displaying Data on the Monitor Panel

On the WE7251, you can switch the display to a monitor panel that displays only the measured values.



Displaying the Waveform

The waveform is displayed in the waveform monitor of the WE7000 Control Software.

Automatic Saving of Waveform Data

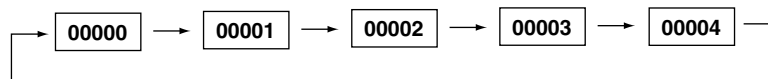
Besides saving the data displayed on the waveform monitor, you can also have the waveform data automatically saved using a trigger or save the data continuously in free run mode.

During Trigger/Gate Mode

There are two methods of saving the data.

- Cyclic

You specify the number of files and the data are saved in a cyclic pattern within the specified number of files until the measurement is stopped. The newest data is not the file with the largest file number, but the file to which the data were saved immediately before stopping the measurement.



- File number limit

You specify the number of files and the data are saved up to the specified number and then the operation stops.

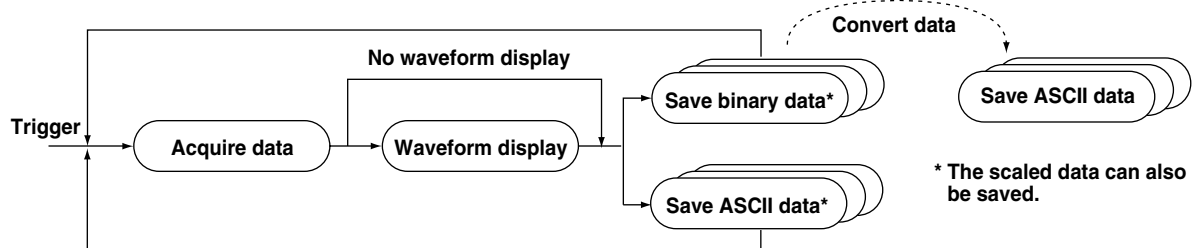
During Free Run Mode

You can select to save the data to one file or to multiple files by specifying the number of data points.

Converting the Waveform Data

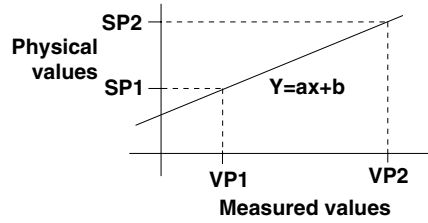
Waveform data that are saved can be converted to ASCII data in CSV format (*.csv) or to a physical value in 32-bit floating point format (conforming to IEEE754-1985) (*.wvf).

This file conversion can also be performed on data saved with the waveform monitor.



Scaling the Measured Data

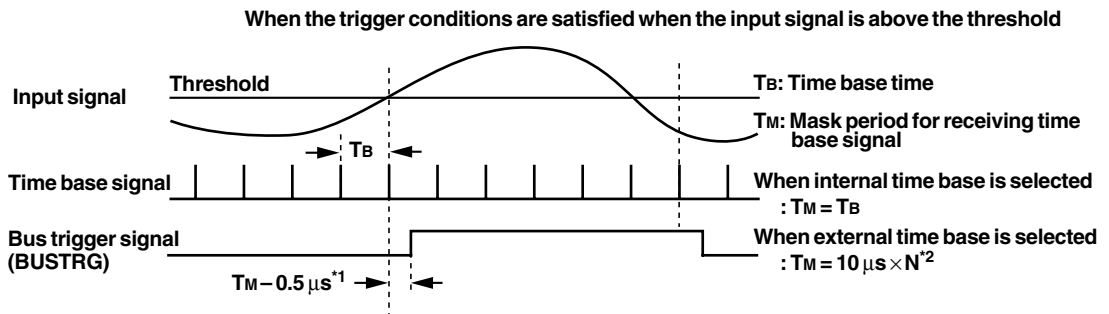
Set the measured values at any two points (VP1 and VP2) and their corresponding physical values (SP1 and SP2). The values at these four points define the scale conversion equation ($Y=ax+b$). The measured values are converted to physical values according to this equation, and the waveform display and saving operations are carried out.



1.6 Synchronizing to Other Modules Using the Bus Trigger/Time Base Signal

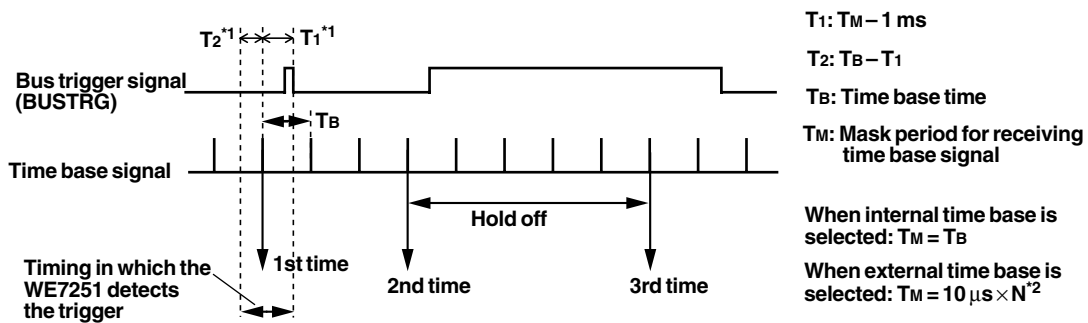
Input/Output of Bus Trigger Signals

The 10-CH, 100 kS/s Digitizer Module WE7251 can output bus trigger signals based on the results of comparing the input signal with the threshold (see 1.4, "Setting the Trigger" for details on how to set the trigger). Because the comparison between the input signal and the threshold is done in sync with the time base signal, the bus trigger signal changes in sync with the time base signal and "True" is output during the time the trigger conditions are satisfied.



- * 1 This value is a typical value (not strictly guaranteed).
- * 2 N is the number of measurement input channels when there is one WE7251 module. N = 10 when multiple modules are linked.

The WE7251 can also acquire data by following the bus trigger signal. If the bus trigger signal becomes "True" within the time period (T_1 , T_2) around the time base signal as shown in the figure below, then the trigger is considered to have been satisfied by the data sampled at that time. Note the following when making multiple acquisitions in the trigger mode. Because the bus trigger signal is detected on the level of the signal, if the duration in which the bus trigger signal remains "True" is longer than the hold off period, the next acquisition starts after the hold off period.



If the bus trigger signal becomes "True" during this period, trigger is considered to have occurred during this sampling.

- * 1 This value is a typical value (not strictly guaranteed).
- * 2 N is the number of measurement input channels when there is one WE7251 module. N = 10 when multiple

In addition, the WE7251 can output a bus trigger signal upon detecting a trigger within the module, and receive the results of the AND/OR computation on the bus to trigger the actual trigger operation. However, if the acquisition mode is set to gate, the sample up to the point when the trigger detected within the module becomes "False" is acquired (one extra sample), because the timing for the bus trigger to change to "False" is later than the trigger detected within the module.

Input/Output of Time Base Signals

While the data acquisition is in progress, the time base signal generated by the internal clock of the WE7251 can be output to the time base signal bus (CMNCLK) in the measuring station. The time difference between the internal clock and the time base signal (CMNCLK) is approximately 100 ns (typical value*).

Conversely, the WE7251 can input and synchronize to the time base signal (CMNCLK) on the bus in order to sample the input signal. If the period of the time base signal is shorter than the range setting of the sampling interval (see section 1.3, "Setting the Conditions for Acquiring the Waveform"), the time base signal is sometimes ignored and the sampling does not occur. The delay from the time the time base signal enters the WE7251 to the time the sampling starts is approximately 80 ns (typical value*).

* Typical value represents a typical or average value. It is not strictly guaranteed.

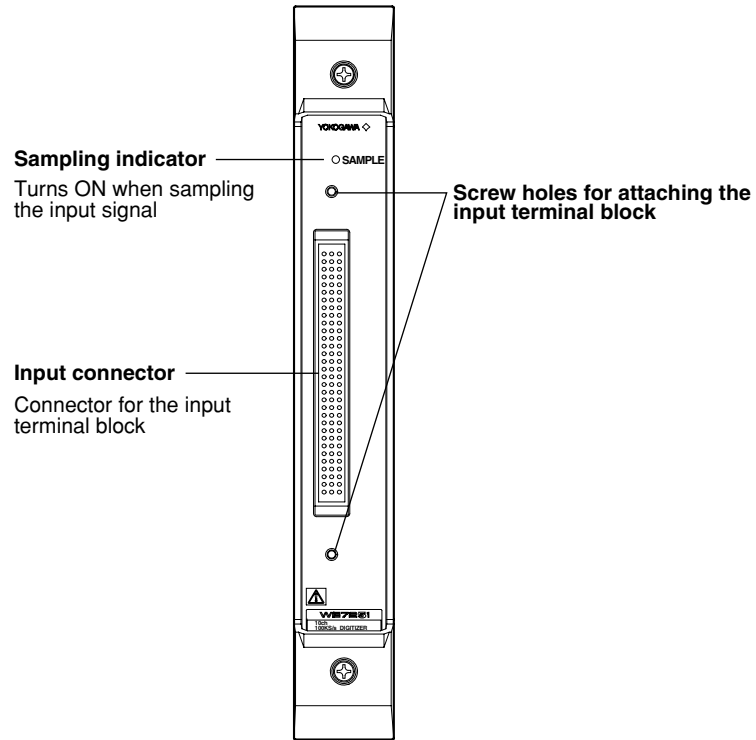
Controlling the Timing of the Start of the Measurement (Arming)

When the arming signal bus is connected to the measurement module in the trigger source/time base source setting dialog box, clicking the [Start] button on the operation panel causes the module to enter the arming signal wait state. The measurement starts when the arming signal becomes [True].

If [Repeat] check box of the [Start] button is selected, the module enters the arming signal wait state after each measurement. When the arming signal becomes [True] again, the module acquires the next waveform.

1.7 Names and Functions of Sections

Front Panel

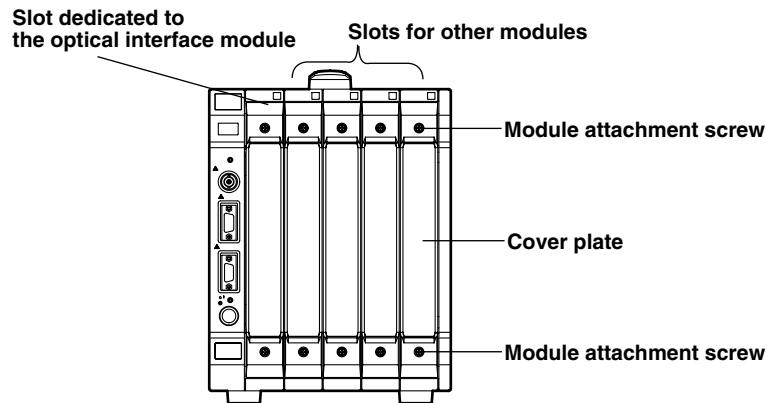


2.1 Installing the Module into the Measuring Station

Preparing to Install the Module

The measuring station comes with each slot covered with a cover plate as shown in the figure below. Verify that the power supply is not connected to the measuring station, then loosen the module attachment screws (2 locations) and remove the cover plate from the slot where the module is going to be installed. Please note that the slot on the left end is dedicated to the communication module and therefore this module cannot be installed there.

* The following figure shows an example of the measuring station WE400.



Installing the Digitizer Module



WARNING

- Make sure to fasten the top and bottom attachment screws. If you connect the input signal cable without fastening the attachment screws, the protective grounding of the Measurement module provided by the power cord is compromised and may cause electric shock.



CAUTION

- To avoid damaging the instrument when installing modules, make sure to turn OFF the standby power switch of the measuring station.
- Be careful not to get your fingers caught in the ejection lever when inserting the module. In addition, do not put your hand inside the slot, because there are protrusions along the module guide that may injure your fingers.
- Do not remove the cover plates from unused slots. It can cause overheating and malfunction. The cover plates are also needed to minimize the influence of electromagnetic interference.

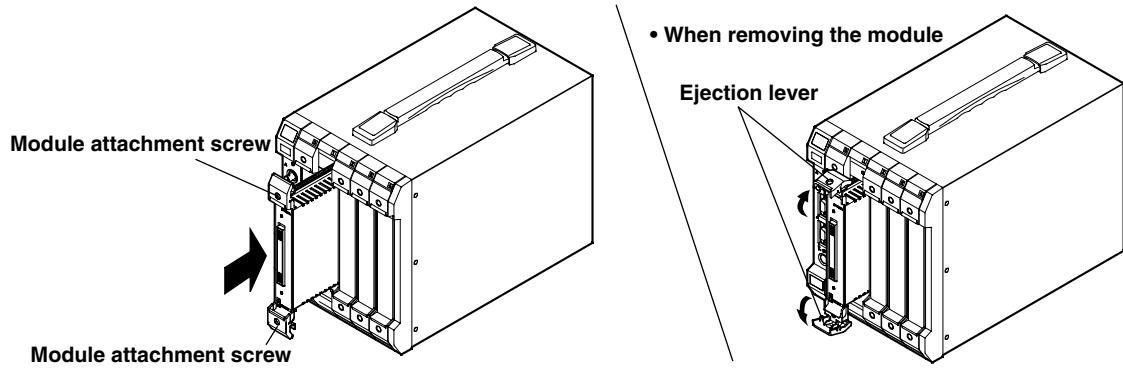
Insert the module along the guide rail of the slot from which you removed the cover plate. Insert the module until it clicks into the connector. Be careful not to get your fingers caught in the ejection lever while inserting the module.

When the module is securely inserted, fasten the module attachment screws (tightening torque: 0.6 to 0.7 N-m).

To remove the module, loosen the module attachment screws and pull the ejection lever from the inside to the outside. This will force the module out of the slot.

<There is an illustration on the next page.>

2.1 Installing the Module into the Measuring Station



Note

When synchronization of the measurements is desired, install the multiple digitizer modules in adjacent slots.

2.2 Connecting the Input Terminal Block and the Input Signal Wire

You cannot connect the input signal wires directly to the digitizer module. To connect the input signal wires, you need the input terminal block (Model: 707821 sold separately).

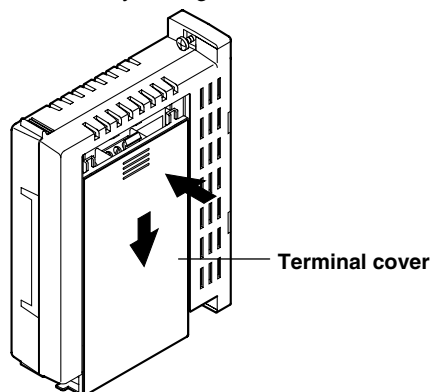
Connecting the Signal Wires to the Input Terminal Block



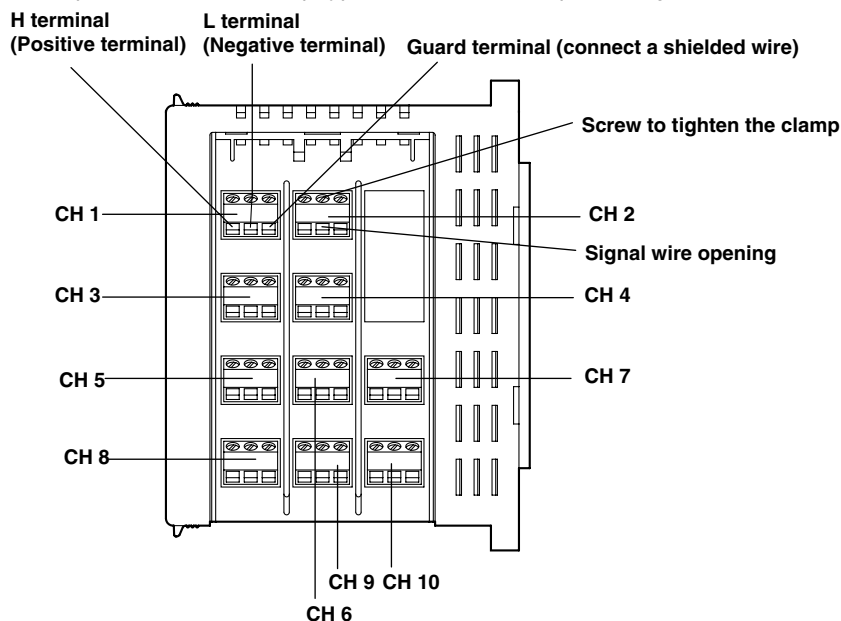
CAUTION

- Do not apply a voltage exceeding the following levels, as it may damage the module.
Maximum allowable input range: 30 VAC rms, 42.4 V peak or ± 60 VDC
(Overvoltage Category: CAT I and II)
Maximum common mode voltage: 100 V rms or ± 100 VDC between the case and the L terminal
- Remove the input terminal block from the module when connecting the signal wires to avoid damaging the module.
- The guard terminal is connected to the L terminal at the input section of the module. Connecting the H side to the guard terminal creates a short circuit and may damage the module.

As indicated in the figure below, the terminal cover of the input terminal block can be removed by sliding the terminal cover while depressing the edge of the cover.

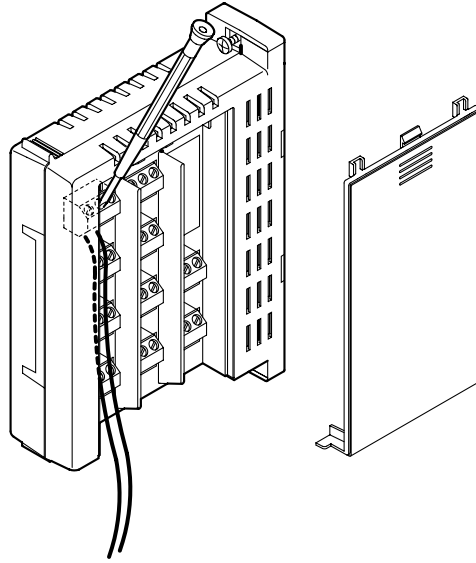


The input terminal is a clamp type terminal, and the pin arrangement is as follows.



2.2 Connecting the Input Terminal Block and the Input Signal Wire

When connecting the input signal wire to the clamp type terminal, loosen the screw holding down the clamp, insert the input signal wire into the opening, and then tighten the screw.



Note

To prevent noise, shield the input signal wires, and connect the end of the shielded wire to the guard terminal of the input terminal block.

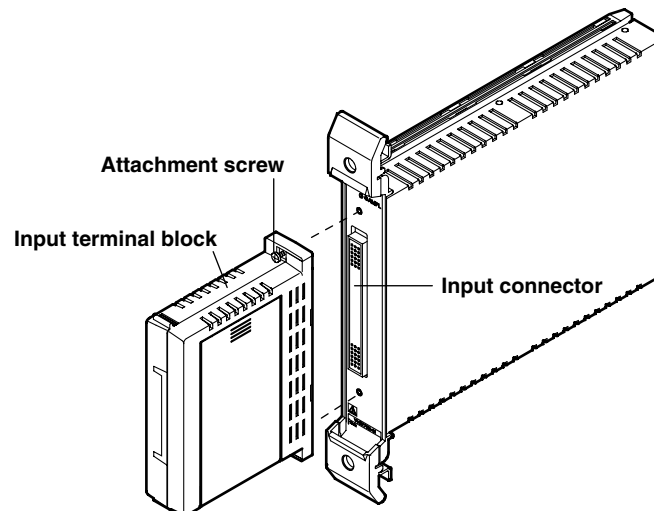
Connecting the Input Terminal Block



CAUTION

- When connecting the input terminal block to the module, make sure to turn OFF the standby power switch on the measuring station.
-

As illustrated in the figure below, connect the input terminal block (Model: 707821 sold separately) to the input connector of the module. After inserting the connector into the input connector of the module, the input terminal block is screwed in place with the two attachment screws.



3.1 Troubleshooting

- If servicing is necessary, or if the instrument is not operating correctly after performing the following corrective actions, contact your nearest YOKOGAWA dealer.
- To verify that the module is operating correctly, perform the self test as described on the next page.

Problem	Probable Cause/Corrective Action	Reference
Module does not operate.	Check to see that the module is installed correctly into the station. Also, install the module into another slot, and check whether it will operate there. If it operates in the other slot, the measuring station is likely to have malfunctioned. If the module is installed correctly and does not operate, the connector might be bad or the IC may have malfunctioned. In either case, contact your nearest YOKOGAWA dealer to have it repaired.	2-1, *
Waveform data cannot be acquired.	Check to see that the input signal wires are connected properly. Also check the input terminal block connection.	2-3, 2-4
Noise enters the input signal	If the signal line and the AC power supply line are close to each other, move them apart. Also make sure that the signal line is away from the noise source. Change to a shielded signal wire if you are not already using one.	—
Measured values are not correct.	Check whether the ambient temperature and humidity are within the allowed ranges. If you did not allow a warm-up time of 30 minutes, try measuring again after the warm-up time has passed. Check that the output impedance of the signal source is less than the maximum source resistance that is allowed.	4-4 4-1
Triggering does not work	Check whether the trigger setting is adequate for the input source in the trigger operation panel. If you are using the bus trigger signal, check whether the setting is correct in the trigger source/time base source/arming setting dialog box of WE7000 Control Software.	1-2, 1-6, 1-7 *
The waveform monitor is not displayed.	Check that the [Waveform monitor ON/OFF] button, that is located to the right of the [Start] button on the operation panel, is turned ON.	1-2

* See the WE7000 User's Manual (IM 707001-01E).

3.2 Self Test

If you believe that the module is not operating correctly, perform the self test according to the following steps.

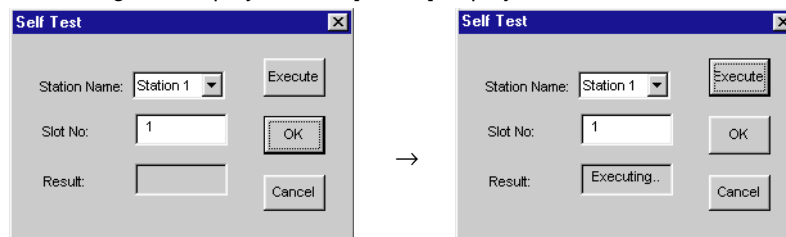
Executing Self Test

1. Select [Self Test] from the [System] menu of the WE7000 Control Software.



2. In the [Self Test] dialog box that appears, select the station name and enter the slot number corresponding to the module, and click the [Execute] button.

"Executing..." is displayed in the [Result] display box.



Verifying Test Results

If a value other than "0" is displayed in the "Result" display box of the "Self Test" dialog box, the module is probably malfunctioning. Please contact your nearest YOKOGAWA dealer.

3.3 Maintenance

Maintenance of Parts

There are no parts in this module that require periodic replacement.

Calibration

We recommend that you calibrate the Measurement module once a year to assure its measurement accuracy. Please contact your nearest YOKOGAWA dealer to have the module calibrated.

4.1 Performance Specifications

Number of Input Channels

10

Input Format

Floating unbalanced input (multiplexer format, no isolation between channels), isolation between the input and ground

Input Coupling

DC

A/D Resolution

16 bits

Input Impedance

Approx. 1 M Ω

Maximum Source Resistance

100 Ω or less

Input Filter

OFF/1 kHz (–3 dB attenuation point)

Frequency Characteristics

DC to 10 kHz (–3 dB attenuation point, during filter OFF) (Typical value*)

Measurement Range/Accuracy (Ambient Temperature: 23 \pm 5°C, Ambient Humidity: 50 \pm 10% RH, after the Warm-up Time Has Passed)

Range	Accuracy	Temperature coefficient (at 5-18°C or 28-40°C)
\pm 1 V	\pm (0.05% of rdg +1 mV)	\pm (50 ppm of rdg +70 μ V)/°C
\pm 2 V	\pm (0.05% of rdg +1.6 mV)	\pm (50 ppm of rdg +0.1 mV)/°C
\pm 5 V	\pm (0.05% of rdg +3.2 mV)	\pm (50 ppm of rdg +0.18 mV)/°C
\pm 10 V	\pm (0.07% of rdg +10 mV)	\pm (70 ppm of rdg +0.7 mV)/°C
\pm 20 V	\pm (0.07% of rdg +20 mV)	\pm (70 ppm of rdg +1.0 mV)/°C

Acquisition Method

Trigger, free run, gate

Memory Length of Acquisition Memory

1 Mword

Memory Partition (Partition Possible Only When Trigger Mode Is Selected)

Select from 1/2/4/8/16/32/64/128/256 partitions

Maximum Record Length

1 Mword

Time Base Source

Module's internal clock, or the time base signal (CMNCLK) of the measuring station

Minimum Sampling Interval

Number of measurement channels \times 10 μ s (when the filter is turned OFF)

Internal Time Base

When the filter is turned OFF: 10 μ s to 10 s, When the filter is turned ON: 1 ms to 10 s

Trigger Source

Input signal (includes input signals of other digitizer modules that are linked), or the bus trigger (BUSTRG1/BUSTRG1) signal of the measuring station

Bus Trigger Signal (BUSTRG1/BUSTRG2) Output Source

Able to output the trigger detected from the input signal

Trigger Level

Resolution: 10 mV at \pm 1/2/5 V range, 100 mV at \pm 10/20 V range

Hysteresis width: 0.8% of (upper limit of range – lower limit of range) (Typical value*)

Measurement accuracy: 0.2% of \pm (upper limit of range – lower limit of range)

4.1 Performance Specifications

Trigger Type

Edge trigger, state trigger, window trigger, combination trigger (AND/OR of the input signals)

Pre-trigger Amount

Set in the range from 0 to (record length – 2)

Connector Type

DIN connector (96 pins, male)

* Typical value represents a typical or average value. It is not strictly guaranteed.

4.2 Default Values (Factory Default Settings)

On (measurement ON/OFF): On(CH1), Off(CH2 to CH10)
Range (measurement range): 20V
Acquisition Mode : Triggered
Sampling Interval: 10us
Memory Partition: 1
Record Length: 1000
No. of Acquisitions: 1
Filter 1kHz (input filter): Off
Time Base: Internal
Trig Type: Rise(CH1), Off(CH2 to CH10)
Trig High (trigger level): 0 V
Trig Source : Internal
Trig Combination: OR
Pretrigger : 0 samples
Hold Off: 1000 samples
Overlapped Acquisition: Off
Repeat (continuous measurement): On

4.3 General Specifications

Safety Standards

Complies with CSA C22.2 No.1010.1 and EN61010-1, conforms to JIS C1010-1.

- Overvoltage category CAT I and II¹
- Pollution degree 1 and 2²

EMC Standards

Emission

Complying standard

EN55011 Group 1 Class A

This product is a Class A (for commercial environment) product. Operation of this product in a residential area may cause radio interference in which case the user is required to correct the interference.

Immunity

Complying standard

EN50082-2

Influence in the immunity environment

Noise increase: $\leq \pm 20$ mV

Testing condition

- Connect with the Input Terminal Block (Model 707821).
- 10 μ s Sampling Interval; 1 V Range; Input 3 m flat cable with 100 Ω terminated.

Warm-up Time

At least 30 minutes

Maximum Allowable Input Voltage

30 VAC rms, 42.4 V peak or ± 60 VDC

(Overvoltage Category: CAT I and II)

Maximum Common Mode Voltage

Between the L terminal and ground: 100 VAC rms or ± 100 VDC

Insulation Withstand Voltage

Between input terminal and ground: 60 Hz 1000 VAC rms for one minute

Insulation Resistance

Between input terminal and ground: 500 VDC, 10 M Ω or more

Operating Conditions

Same as those of the measuring station

Storage Conditions

Temperature: -20 to 60°C

Humidity: 20 to 80% RH (no condensation)

Power Consumption

8 VA (Typical value^{*3} at 100 V/50 Hz)

Weight

Approx. 0.7 kg

External Dimensions

Approx. 33(W) \times 243(H) \times 232(D)mm (projections excluded)

Number of Used Slots

1

Standard Accessories

User's Manual (1)

Optional Accessories

707821 Input terminal block

- ^{*1} Overvoltage Categories define transient overvoltage levels, including impulse withstand voltage levels.
- Overvoltage Category I: Applies to equipment supplied with electricity from a circuit containing an overvoltage control device.
- Overvoltage Category II: Applies to equipment supplied with electricity from fixed installations like a distribution board.
- ^{*2} Pollution Degree: Applies to the degree of adhesion of a solid, liquid, or gas which deteriorates withstand voltage or surface resistivity.
- Pollution Degree 1: Applies to closed atmospheres (with no, or only dry, non-conductive pollution).
- Pollution Degree 2: Applies to normal indoor atmospheres (with only non-conductive pollution).
- ^{*3} Typical value represents a typical or average value. It is not strictly guaranteed.

4.4 Specifications of the Input Terminal Block

Number of Input Channels

10 (The H, L, and G of each input channel are independent)

Input Format

Each input channel is floating*

Temperature Measurement Element

100-Ω Platinum resistance temperature detector class A

* This is the specification for the input terminal block by itself. Actually, the value depends on the specifications of the measurement module to which it is connected.

General Specifications

Operating conditions

Temperature: 5°C to 40°C

Humidity: 20% to 80% RH (except maximum wet bulb temperature of 29°C, no condensation)

Storage conditions

Temperature: -20°C to 60°C

Humidity: 20% to 80% RH

Maximum allowable input voltage*

30 VAC rms, 42.4 V peak or ±60 VDC (Overvoltage category: CAT I and II)

Maximum voltage between channels*

60 VAC rms or ±100 VDC

Maximum allowable input current*

0.3 A

Insulating withstand voltage*

Between channels and between input terminal and case: 60 Hz 1500 VAC rms for one minute

Insulation resistance*

Between channels and between input terminal and case: 500 VDC, 10 MΩ or more

Diameter of the cable that can be connected

0.14 to 1.38 mm²

Recommended length of stripped wire

6 mm

Modules to which the input terminal block can connect

707241(10-CH Digital Thermometer Module)

707251(10-CH, 100 kS/s Digitizer Module)

Weight

Approx. 0.22 kg

External dimensions

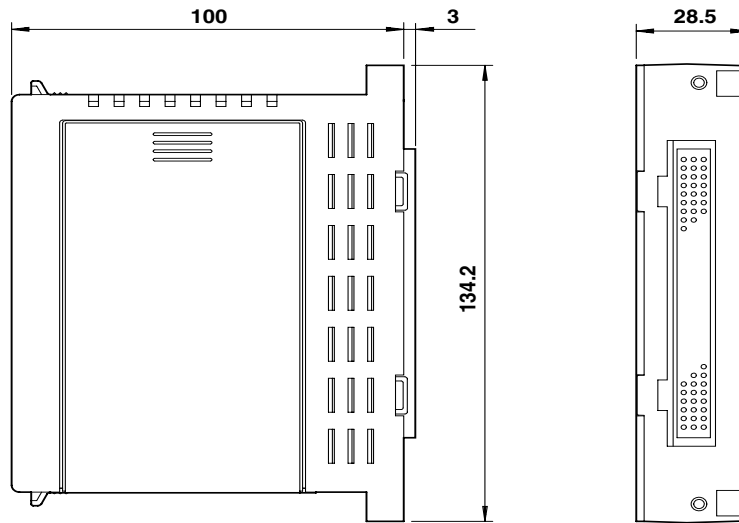
Approx. 29(W) × 135(H) × 103(D)mm (protrusions excluded)

* This is the specification for the input terminal block by itself. Actually, the value depends on the specifications of the Measurement module to which it is connected.

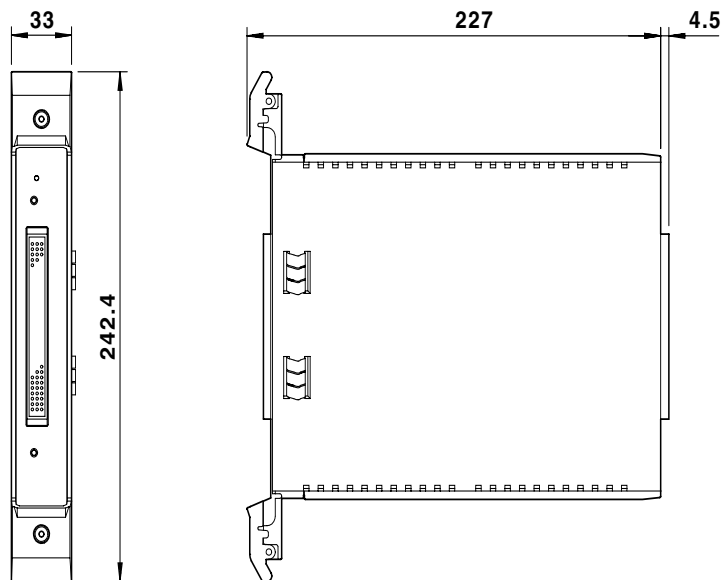
4.5 Dimensional Drawings

Unit: mm

10-CH, 100 kS/s Digitizer Module (WE7251)



Input Terminal Block (707821)



If not specified, the tolerance is $\pm 3\%$. However, in cases of less than 10 mm, the tolerance is ± 0.3 mm.

Index

A

Acquisition method, selecting	1-3
Acquisition Mode	1-3
AND trigger	1-6
Arming	1-11

B

Both	1-6
Bus trigger signal, input/output of	1-10
BUSTRG	1-6

C

Cyclic	1-8
--------------	-----

E

Edge trigger	1-6
--------------------	-----

F

Fall	1-6
File conversion	1-8
File number limit	1-8
Filter 1 kHz	1-5

G

Gate mode	1-3
-----------------	-----

H

High	1-6
Hold Off	1-7

I

In	1-6
Input connector	1-12
Input filter, turning ON/OFF	1-5
Input terminal	2-3
Input terminal block	2-3
Internal	1-6

L

Low	1-6
-----------	-----

M

Measurement range, selecting	1-3
Memory Partition	1-4
MODEL	2
Module, installation of	2-1

N

NO	2
----------	---

O

OR trigger	1-6
Out	1-6

P

Package	2
Pretrigger	1-7

R

Record Length	1-4
Repeat	1-3
Rise	1-6

S

Sampling indicator	1-12
Sampling Interval	1-4
Scale conversion	1-9
Self test	3-2
Start timing of measurement, controlling	1-11
State trigger	1-6

T

Time Base	1-5
Time base signal, input/output of	1-11
Trig High	1-6
Trig Low	1-6
Trigger hold off, setting	1-7
Trigger level, setting	1-6
Trigger mode	1-3
Trigger slope	1-6
Trigger source, selecting	1-6
Trigger type, selecting	1-6
Troubleshooting	3-1

W

Waveform data, automatic saving of	1-8
Window trigger	1-6