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WE500/WE900
Measuring Stations

■ Overview
The WE500 and WE900 measuring stations are mounting units for the measurement modules. They consist of a case, power supply, and CPU board (32-bit RISC processor), and are capable of identifying installed modules and controlling communication between the modules and PC. Additionally, measurement modules within the measuring stations can exchange trigger and time-base signals with external equipments.

Since USB and the Ethernet communication function are built in the station, a communication module is not necessary (except for optical communications).

■ Features
• Plug & Play support for measuring stations (USB)
• Plug & Play support for measurement modules
• Small-size (the WE500 footprint is roughly the size of a sheet of A4 paper)
• 32-bit CPU for controlling operations
• USB (conforms to Rev. 2.0), Ethernet (100BASE-TX, 10BASE-T) interface
• High-speed fiber optic interface (sold separately)
• Remote power ON/OFF function
• Expandable
• Inexpensive

■ Functions
• Automatic recognition of measurement modules
• Automatic module linking function
• Trigger and time-base signal I/O
• Digital I/O interface

■ Standard Specifications
Number of Slots
WE500: 5
WE900: 9
Bus
WE Bus (Yokogawa proprietary bus)
Trigger/Time Base (within WE Bus)
Trigger
Trigger source: TRIG input, communication, measurement module, EXT. I/O input
Number of bus triggers: 2 (BUSTRG1/BUSTRG2)
Time base
Time base source: TRIG input, communication, measurement module, EXT. I/O input
Number of time base: 1 (CMNCLK)

Signal Input/Output
TRIG
Connector type: BNC
Pulse width: 100 ns or more (or 50 ms or more as an arming source)
Detection level: High active/Low active
Input impedance: Approx. 47 k\(\Omega\)
Input level: CMOS level
Maximum allowable input voltage: –3 V to +8 V
(Overvoltage Category CAT I and II)
* Able to connect to bus trigger (BUSTRG1/BUSTRG2) or time base (CMNCLK)

EXT. I/O
Connector type: 15-pin D-sub type (female)
Input/output level: CMOS level
Trigger input/output: Bus trigger (BUSTRG1/BUSTRG2) and common (switch input and output)
Input impedance: Approx. 47 k\(\Omega\)
Input pulse: 100 ns or more
Maximum input frequency: 5 MHz
Maximum allowable input voltage: –3 V to +8 V (Overvoltage Category CAT I and II)
Output impedance: Approx. 100 \(\Omega\)
Maximum output current: ±3.2 mA

Timebase input/output: Common clock (CMNCLK) and common (switch input/output, rising edge active)
Input impedance: Approx. 47 k\(\Omega\)
Input pulse: 100 ns or more
Maximum input frequency: 5 MHz
Maximum allowable input voltage: –3 V to +8 V (Overvoltage CAT I and II)
Output impedance: Approx. 100 \(\Omega\)
Maximum output current: ±3.2 mA
Simple DIO input/output: control output, detect input condition
- Bit number: 4 bit (inside Pull Down)
- Input impedance: Approx. 47 Ω
- Maximum allowable input voltage: –3 V to +8 V (Overvoltage CAT I and II)
- Output impedance: Approx. 100 Ω
- Maximum output current: ±3.2 mA

Bus active output: Indicates that the bus active (High level) condition
- Output impedance: Approx. 100 Ω
- Maximum output current: ±3.2 mA

Communication
USB
- Electrical and mechanical specifications: Conforms to USB Rev. 2.0 (When USB of PC to be used is USB1.1, it operates as an USB1.1 instrument)
- Transmission speed: Maximum 480 Mbps
- Port number: 1

Ethernet
- Port number: 1
- Electrical and mechanical specifications: Conforms to IEEE802.3
- Transmission method: Ethernet (100BASE-TX, 10BASE-T)
- Transmission speed: Maximum 100 Mbps
- Communication protocol: TCP/IP
- Corresponding service: DHCP client
- Connector form: RJ-45 connector

General Specifications:
Safety standards
- Complies with CSA C22.2 No. 1010.1 and EN61010-1, conforms to JIS C1010-1
- Overvoltage Category CAT II¹
- Pollution degree 1 and 2²

¹ Overvoltage Categories define transient overvoltage levels, including impulse withstand voltage levels.
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).

EMC standards
- Emission
  - Complying standard
    - EN55011 Group 1 Class A, EN61326 Class A, AS/NZS CISPR11 Class A
    - EN61000-3-2
    - EN61000-3-3

- Immunity
  - Complying standard
    - EN61326 Industrial Environment
    - Machine noise (for Germany)
    - Machine Noise information Ordinance 3.
    - GSGV, 18.01.1991:
      - Der höchste Schalldruckpegel beträgt 70 dB(A) oder weniger gemäß EN27779.

Standard operating conditions
- Ambient temperature: 23 ±2°C
- Ambient humidity: 50 ±10% RH
- Power voltage and frequency fluctuation: 1% or less of the ratings

Operating conditions
- Temperature: 5 to 40°C
- Humidity: 20 to 80% RH (except maximum wet bulb temperature of 29°C, no condensation)

Storage conditions
- Temperature: –20 to 60°C
- Humidity: 20 to 80% RH
- Operating altitude: 2000 m or below
- Storage altitude: 3000 m or below

Rated supply voltage
- 100 to 120 VAC/200 to 240 VAC (auto switching)
- Permitted supply voltage range 90 to 132 VAC/180 to 264 VAC
- Rated supply voltage frequency 50/60 Hz
- Permitted supply voltage frequency 48 to 63 Hz

Maximum power consumption¹
- WE500: No modules installed: 160 VA
  - Maximum load: 370 VA
- WE900: No modules installed: 200 VA
  - Maximum load: 570 VA

High frequency current from power supply
- Conforms to IEC1000-3-2

External dimensions
- WE500: Approx. 213(W) × 266(H) × 360(D) mm (projections excluded)
- WE900: Approx. 350(W) × 266(H) × 360(D) mm (projections excluded)
Weight
WE500: Approx. 6.5 kg (modules excluded)
WE900: Approx. 11 kg (modules excluded)

Cooling method
Forced air cooling

Installation position
Horizontal

Accessories
Power cord (1)
WE7000 Control Software Setup Disk (1 CD-ROM)
USB cable (2 m, conforming to USB 2.0, A type-B type) (1)
15-pin D-sub connector (male) for connecting to EXT. I/O
Cover plates (WE500: 5 plates, WE900: 9 plates)
User’s Manual (this manual) (1)

*1 Power consumption of the measuring station when modules are installed cannot be determined by simply summing the power consumptions of each module because the power efficiency and the power factor changes according to the load conditions as well as to the supply voltage and frequency.

AVAILABLE MODELS

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Codes</th>
<th>Name/Description</th>
</tr>
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<tbody>
<tr>
<td>707003</td>
<td>-0</td>
<td>WE500 Measuring Station (5 slots)</td>
</tr>
<tr>
<td>707004</td>
<td>-D</td>
<td>100 to 240 VAC</td>
</tr>
<tr>
<td></td>
<td>-F</td>
<td>UL, CSA Standard</td>
</tr>
<tr>
<td></td>
<td>-H</td>
<td>VDE Standard</td>
</tr>
<tr>
<td></td>
<td>-R</td>
<td>GB Standard</td>
</tr>
<tr>
<td></td>
<td>-Q</td>
<td>SAA Standard</td>
</tr>
<tr>
<td></td>
<td>/HE</td>
<td>BS Standard</td>
</tr>
</tbody>
</table>

Accessories (sold separately)

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Model</th>
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<th>Order quantity</th>
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<tr>
<td>Rack mount bracket</td>
<td>707861</td>
<td>For 707003 standalone installation</td>
<td>1</td>
</tr>
<tr>
<td>Rack mount bracket</td>
<td>707862</td>
<td>For 707003 ganged installation</td>
<td>1</td>
</tr>
<tr>
<td>Rack mount bracket</td>
<td>707863</td>
<td>For 707004</td>
<td>1</td>
</tr>
</tbody>
</table>

Dimensions

WE500
WE7021
GP-IB Controller Module

■ Overview
The WE7021 GP-IB controller module is installed in a measuring station to control equipment provided with a GP-IB interface. The module, however, is not designed for connecting the measuring station with a personal computer.

■ Features
• Allows GP-IB instruments to be used in combination with WE7000 series modules
• Can be combined with an optical communication interface or an Ethernet interface to control remote GP-IB instruments
• Enables control of Yokogawa’s 7555 digital multimeter and WT130, WT200, WT210, WT230 digital power meter using WE7000 control software

■ Performance Specifications

Electrical/Mechanical Specifications
Conforms to IEEE St’d 488-1978 (JIS C 1901-1987)

Functional Specifications

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<thead>
<tr>
<th>Function</th>
<th>Subset Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source handshake</td>
<td>SH1</td>
<td>All transmission handshaking functions available</td>
</tr>
<tr>
<td>Acceptor handshake</td>
<td>AH1</td>
<td>All reception handshaking functions available</td>
</tr>
<tr>
<td>Talker</td>
<td>T6</td>
<td>Basic talker functions, serial polling, talker release function using MLA (My Listen Address) is available.</td>
</tr>
<tr>
<td>Listener</td>
<td>L4</td>
<td>Basic listener functions, listener release function using MTA (My Talk Address) is available, no listen only function.</td>
</tr>
<tr>
<td>Service request</td>
<td>SR0</td>
<td>No service request function</td>
</tr>
<tr>
<td>Remote/local</td>
<td>RL0</td>
<td>No remote/local function</td>
</tr>
<tr>
<td>Parallel polling</td>
<td>PP0</td>
<td>No parallel polling function</td>
</tr>
<tr>
<td>Device clear</td>
<td>DC0</td>
<td>No device clear function</td>
</tr>
<tr>
<td>Device trigger</td>
<td>DT0</td>
<td>No device trigger function</td>
</tr>
<tr>
<td>Electrical characteristics</td>
<td>E1</td>
<td>Open collector</td>
</tr>
</tbody>
</table>

Used code: ISO (ASCII) code
Protocol: Conforms to IEEE-St’d 488.2
Transfer format: IEEE-488 (GP-IB)
Signal logic:
Negative logic
“L” level: 0.8 V or less
“H” level: 2.0 V or more
Total cable length: 20 m or less
Cable length between devices: 4 m or less
Number of connections: 15 devices or less
### General Specifications

Operating conditions: Same as that of the measuring station

Storage conditions
- Temperature: –20 to 60°C
- Humidity: 20 to 80% RH (no condensation)

Power consumption: 1 VA (Typical value at 100 V/50 Hz (see Note))

External dimensions: Approx. 33{1.3}(W) × 243{9.54}(H) × 232{9.12}(D) mm [inch] (projections excluded)

Weight: Approx. 0.6{1.32} kg [lb]

Number of used slots: 1

Standard accessory: User’s Manual (1)

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

### AVAILABLE MODEL

<table>
<thead>
<tr>
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<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>707021/HE</td>
<td>GP-IB Controller Module</td>
</tr>
</tbody>
</table>

### Dimensions

Unit: mm (inch)
Overview

The WE7035 and WE7036 optical interface cards are installed in a Windows PC with an PCI bus to allow high speed communication between measuring stations and PC. These cards contain a CPU (32-bit RISC CPU) which controls communication.

Features

- High-speed data communication (250 Mbps) using optical fiber cable
- Maximum cable length: 500 meters (1640 ft)
- High electromagnetic immunity
- The two-port version (WE7036) allows multiple stations to be connected in a daisy chain, or in a ring.

Functions

- Remote ON/OFF control of main power on measurement station
- Auto-configuration

Specifications

- Number of interface ports: 1 on WE7035, 2 on WE7036
- Light source: 1300-nm LED
- Connection method: Optical fiber with dual SC connector (plurals stations are connected in daisy chain)
- Transmission rate: 250 Mbps
- Cable length between stations: Maximum 500 meters (1640 ft) (using optical fiber cable specified by Yokogawa)
- Number of stations that can be connected: 3 stations or less
- Connection fiber: Duplex multimode optical fiber with dual SC connector (graded index silica multimode optical fiber, core diameter: 50 µm or 62.5 µm, cladding diameter: 125 µm)
- Slot: 1 PCI bus expansion slot (full size)

General Specifications

- Operating condition
  Operating temperature range: 5 to 40°C
  Operating humidity range: 20 to 80% RH (no condensation)
- Storage environment
  Storage temperature range: −20 to 60°C
  Storage humidity range: 20 to 80% RH
- Current consumption: 1.4 A (typical (see Note))
- Source voltage: 5 V ±10%
- External dimensions: Approx. 220[0.94] × 126[5.04] (H) × 195[11.97] (D) mm [inch] (projections excluded)
- Weight: Approx. 0.3[0.066] kg [lb]

Note: Typical value represents a typical or average value. It is not strictly guaranteed.
WE7037/WE7038
Optical Interface Modules
(for measuring stations)

■ Overview
The WE7037/WE7038 optical interface modules are installed to a measuring station to enable high-speed communication between the station and a PC. These modules contain a 32 bit RISC CPU that controls communication.

■ Features
• High-speed communication (250 Mbps) using optical fiber cable
• Maximum cable length: 500 meters (1640 ft)
• High electromagnetic immunity
• The two-port version (WE7038) allows multiple stations to be connected in a daisy chain.

■ Functions
• Remote ON/OFF control of module power on measurement station
• Auto-configuration

■ Standard Specifications
• Number of interface ports: 1 on WE7037, 2 on WE7038
• Light source: 1300-nm LED
• Connection method: Optical fiber with dual SC connector (plural stations are connected in daisy chain)
• Transmission rate: 250 Mbps
• Cable length between stations: Maximum 500 meters (1640 ft) (using optical fiber cable specified by Yokogawa)
• Number of stations that can be connected: 3 stations or less
• LED display: Communication status, station power status
• Connection fiber: Duplex multimode optical fiber with dual SC connector (graded index silica multimode optical fiber, core diameter: 50 µm or 62.5 µm, cladding diameter: 125 µm)
• Control bus: WE bus

■ General Specifications
• Operating condition: same as that of the measuring station.
• Storage conditions
  Storage temperature range: -20 to 60°C
  Storage humidity range: 20 to 80% RH
• Power consumption: 11 VA (typical at 100 V/50 Hz (see Note))
• External dimensions: Approx. 33{1.30} (W) × 243{9.57} (H) × 227{8.94} (D) mm{inch} (projections excluded)
• Weight: Approx. 0.7{1.54} kg{lb}
• Number of dedicated slots: 1
• Accessories: User’s manual (1)

Note: Typical value represents a typical or average value. It is not strictly guaranteed.
WE7081
CAN Bus Interface Module

■ Overview

This module is used to interpret the CAN protocol and monitor the communication data on the bus or output data on the bus. By using this module in combination with other WE7000 measurement modules, the changes in the communication data on the CAN bus and analog data such as voltage and temperature can be measured simultaneously over time. The measurement results can be graphed and saved to files.

Using the WE7000 in this fashion enables you to grasp the entire data within the system and evaluate the CAN system as a whole.

■ Features

CAN Data Acquisition
- Performs trigger measurements on the specific data of the specified ID (up to 64 channels, up to 1 kS/s).
- ID, Start bit, Length, and Endian can be specified and conversion to physical values is possible.

CAN Data Output
- Download data frames and output.
- Manually output data of a specified ID.
- Construct a simple sequence function.

Module Linking
- Simultaneous acquisition of CAN bus data and signals of various measurement modules (analog signals) and display them on the same time axis.

Setup Data
- Import CANdb setup data.

■ Standard Specifications

Number of ports: 1
Connector Type: D-Sub 9-pin (male)
Controller: Philips SJA1000 CAN chip
Transceiver: Built in the module
Terminator: 124Ω, switch the terminator On/Off using the dipswitch on the front panel
Data Memory: 8 MB FIFO buffer
Output Memory: 8 MB FIFO buffer
Supported Protocol
- Physical layer: ISO-11898 (High Speed Communication)
- CAN in Automation: CAN2.0B (Standard & extended message format)
- Save Format of Data: Binary file in WVF (YOKOGAWA measurement standard) format
- Can be saved in binary or ASCII in CSV format

Bit Rate: 10 k, 20 k, 33.3 k, 50 k, 62.5 k, 83.3 k, 100 k, 125 k, 250 k, 500 k, 800 k, 1 Mbps, and Other
- Time quanta and sample point are selectable
- Endian: Little or Big selectable
- Synchronized Operation: Possible by sharing the trigger signal and clock signal

■ General Specifications

Maximum Measuring Input Cable Length: 30 m
Basic Operating Conditions
- Ambient temperature: 23±5°C,
- ambient humidity: 50±10% RH,
- Supply voltage/frequency error: Within 1% of rating, and after the warm-up time has passed
- Warm-up Time: At least 30 minutes
- Operating Conditions: Same as those of the measuring station
- Storage Conditions: Temperature: –20°C to 60°C
- Humidity: 20% to 80%RH
- Power Consumption: 5 VA (typical value* at 100 V/50 Hz)
- Weight: Approx. 0.7 kg
- External Dimensions:
- Approx. 33(W)×243(H)×110(D) mm (projections excluded)
- Number of Used Slots: 1
- Standard Accessories: User’s Manual (this manual) (1)

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

CANdb and CANdb++ are registered trademarks of Vector Informatik Gmbh.
Available Model

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>707081</td>
<td>CAN Bus Interface Module</td>
</tr>
</tbody>
</table>

Dimensions
WE7111
100 MS/s Digital Oscilloscope Module

■ Overview
This module contains a digital oscilloscope with a range of basic functions. Its flash memory contains setup information required for module operations, such as ranges, time axes, and triggers. The setup information is transferred to the PC when the module is connected. The WE7111 can also be used for temporary processing of measurements.

■ Features
• 100 MS/s, A/D 8-bit resolution
• 40 MHz analog bandwidth (real time samples only)
• 100 kWord memory

■ Functions
• Maximum waveform signal sampling rate: 100 MS/s
• Synchronized operations between adjacent WE7111 modules
• High speed waveform display

■ Standard Specifications
• Measurement input section
  Number of input channels: 1
  Input coupling: AC, DC, GND
  Connector type: BNC
  Input impedance: 1 MΩ ±1.5%, about 25 pF
  Voltage sensitivity setting range: 5 mV/div to 5 V/div (1-2-5 steps)
  Maximum input voltage (when frequency is 1 kHz or less): 250 V (DC + AC peak) or 177 VACrms (see Note 1)
  Maximum DC offset setting range (when probe attenuation is set to 1:1): 5 mV/div to 50 mV/div: ±1 V
  100 mV/div to 500 mV/div: ±10 V
  1 V/div to 5 V/div: ±100 V
  Voltage accuracy (see Note 2)
  DC accuracy
    At 100 mV/div: ±(1.5% of 8 div + 1 LSB)
    At other voltage axes: ±(2.5% of 8 div + 1 LSB)
  Offset voltage accuracy (see Note 2)
  5 mV/div to 50 mV/div: ±(2.5% of setting + 0.2 mV)
  100 mV/div to 500 mV/div: ±(1% of setting + 2 mV)
  1 V/div to 5 V/div: ±(2.5% of setting + 20 mV)
  Frequency characteristic (for sinewave input with amplitude equivalent to ±4 div):
    DC up to 40 MHz (~1.5 dB attenuation point (typical value see Note 4))
    Low frequency ~3 dB attenuation point during AC coupling (see Note 2):
    Maximum 10 Hz (maximum 1 Hz when using separately sold 150 MHz passive probe (model 700998))
  Skew between modules (when operating with linked modules) (see Note 2):

WE7111
2 ns per each module (typical value when settings are all the same (see Note 4))
Residual noise level (see Note 3): Larger of the two ≥0.7 mV or ≥0.12 div (typical value (see Note 4))
Isolation between channels (when voltage sensitivities are all the same, DC to 40 MHz, linked modules): ~40 dB (typical value (see Note 4))
A/D conversion resolution: 8 bits (25 LSB/div)
Probe frequency attenuation settings: 1:1, 10:1, 100:1, 1000:1
Bandwidth limit: 20 MHz bandwidth limit can be turned on and off.
Maximum sampling rate: 100 MS/s
Maximum record length: 100 kWords (word = data-point)

■ Trigger section
Trigger sources: Input signal (including input signals from linked WE7111 digital oscilloscope modules), commercial power signal, WE bus trigger (BUSTRG1/BUSTRG2) signals
Bus trigger (BUSTRG1/BUSTRG2) signal output sources:
When an input signal or commercial power signal is selected as the trigger source, the sensed trigger can be output.

Trigger type: Edge trigger

Trigger modes:
AUTO: If the trigger does not occur for more than about 100 ms, the waveform is automatically acquired.
AUTO LEVEL: If the trigger does not occur for more than about 100 ms, the trigger level is automatically set to the amplitude midpoint and the trigger is activated.
NORMAL: The waveform is acquired only when the trigger occurs.

Trigger slopes: Rise, fall, both

Trigger coupling: Select either DC or AC for the trigger source.

HF rejection: Bandwidth limiting (DC up to about 15 kHz) on trigger sources can be turned on and off.
Trigger level (see Note 5)
Setting range: Voltage corresponding to ±10 div of voltage axis sensitivity
Setting resolution: 1/50 div
Accuracy: ±(1 div + 10% of trigger level)
Trigger sensitivity (see Note 5) (see Note 6) (when trigger source frequency is DC to 40 MHz): 1 div

Trigger position:
Setting range: +5.0 div to –5.0 div
Setting resolution: 0.1 div
Trigger delay setting range: 0 to 9.99999999 s
Trigger hold-off setting range: 200 ns to 9.99999999 s

• Time axis
Time axis setting range: 100 ns/div to 200 ms/div
Time axis accuracy (see Note 2): ±(0.01% of reading + 500 ps)

External clock input (EXT CLOCK IN)
Connector type: BNC
Maximum input voltage: –3 to +8 V (see Note 1)
Input frequency range: 40 Hz to 15 MHz (continuous clock only)
Input level: TTL level
Minimum pulse width: 25 ns for both high and low Input type: Non-isolated unbalanced (with 4.7 kΩ pull-up resistance)

• Functions
Auto-setup:
Automatically sets voltage axis, time axis, trigger level.
Initialization: Restores the default settings.
Calibration: Auto-calibration and manual calibration available
Acquisition modes: Select from normal, envelope and averaging.
Record length: 1 kWord, 5 kWords, 10 kWords, 30 kWords, 100 kWords (100 kWords cannot be set in averaging mode)
Input filter: 20 MHz bandwidth limit
Calibration signal output: Square wave (about 1 kHz, about 1 Vpp)

■ General Specifications
Standard operating conditions
Ambient temperature: 23 ±2°C
Ambient humidity: 50 ±10% RH
Source voltage/frequency tolerance: ±1% of rating (after warm-up time has passed)
Warm-up time: Minimum 30 minutes
Operating conditions: Same as that of the measuring station
Storage conditions
Storage temperature range: –20 to 60°C
Storage humidity range: 20 to 80% RH (no condensation)
Power consumption: 15 VA (typical value at 100 V/50 Hz, see Note 4)
External dimensions: Approx. 33{1.30} (W) × 243{9.57} (H) × 232{9.13} (D) mm [inch] (projections excluded)
Weight: Approx. 0.9{1.98} kg [lb]
Number of dedicated slots: 1
Accessories: User’s manual (1)

Note 1: Overvoltage categories CAT I and CAT II
Note 2: Value measured under standard operating conditions after calibration with the trigger signal set to a signal with a rate of change within 10 div/μs and amplitude within ±5 div under the following settings:
Trigger mode: normal, Trigger level: within 60% of the amplitude of the trigger signal, HF rejection: OFF
Note 3: Value when the input section is shorted, record length: 10 kWords, acquisition mode: normal mode, accumulate: OFF, probe attenuation: 1:1.
Note 4: Typical value represents a typical or average value. It is not strictly guaranteed.
Note 5: Value measured under standard operating conditions after calibration with the trigger signal set to a signal with a rate of change within 10 div/μs and amplitude within ±5 div under the following settings:
Trigger mode: normal, Trigger level: within 60% of the amplitude of the trigger signal, HF rejection: OFF
Note 6: Value measured with the voltage sensitivity set to 50 mV/div when a pulse with amplitude 5 div p-p, and rising time of 1 ns is input.
Trigger coupling: DC, HF rejection: OFF

AVAILABLE MODEL

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>707111/HE</td>
<td>100 MS/s Digital Oscilloscope Module</td>
</tr>
</tbody>
</table>

Accessories (sold separately)

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Model</th>
<th>Specifications</th>
<th>Order quantity</th>
</tr>
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<tbody>
<tr>
<td>150 MHz passive probe</td>
<td>700998</td>
<td>Band: 150 MHz</td>
<td>1</td>
</tr>
<tr>
<td>Miniclip converter</td>
<td>B9852CR</td>
<td>Probe accessory (one/unit)</td>
<td>1</td>
</tr>
<tr>
<td>BNC adapter</td>
<td>B9852CS</td>
<td>Probe accessory (one/unit)</td>
<td>1</td>
</tr>
<tr>
<td>Ground lead</td>
<td>B9852CT</td>
<td>Probe accessory (one/unit)</td>
<td>1</td>
</tr>
<tr>
<td>50 Ω terminal equipment</td>
<td>700976</td>
<td>Through-type</td>
<td>1</td>
</tr>
</tbody>
</table>

Dimensions

Unit: mm (inch)
WE7116
2-CH, 20 MS/s Digitizer Module

Overview

The WE7116 2-channel 20 MS/s digitizer module can convert the analog signals of 2 channels to digital signals at a maximum speed of 20 MHz. Equipped with two A/D converters, the module can sample data through two channels simultaneously at 20 MHz.

Two or more modules can be mounted side by side to enable synchronous operation.

Features

• 20 MS/s sampling and 12-bit A/D conversion of both channels simultaneously
• Acquisition by using the external timebase and external trigger is possible
• Operates in sync with an adjacent WE7116 module
• Built-in 4MWords acquisition memory for each channel

Performance Specifications

Number of input channels: 2
Input format: Non-isolated, unbalanced
Connector type: BNC
Input coupling: DC/AC/GND
Measurement range: ±100mV to ±50V (1-2-5 steps)
A/D resolution: Equivalent to 12 bits (includes the sign)
Input impedance: Approx. 1MΩ (approx. 28pF)
Maximum source resistance: 100Ω or less
Frequency characteristics (-3dB attenuation point, during filter off):
- DC coupling: DC to 8 MHz (typical value (see Note 1))
- AC coupling: 5 Hz to 8 MHz (typical value (see Note 1))
DC accuracy (see Note 2): ±0.75% of full scale
Offset voltage setting range: 200% of lower limit of range to 200% of upper limit of range
Offset voltage setting resolution: 0.05% of full scale
Offset voltage accuracy (see Note 3): ±0.5% of setting
Input filter:
- Low-pass filter
- Cut-off frequency: OFF/500kHz/1MHz
Filter characteristics: 5th order elliptic filter
Attenuation characteristics:
- 24 dB at frequency of 1.4 times the cut-off frequency
- 40 dB at frequency of 2.0 times the cut-off frequency (typical value (see Note 1))
Acquisition method: Trigger only (Normal/Auto) (see Note 4)
Memory length of acquisition memory: 4MWord for each channel
Memory partition: Select from 1/2/4/8/16/32/64/128/256/512/1024
Timebase source: Module’s internal clock, external clock, or the time base signal (CMNCLK) of the measuring station (WE bus)

Sampling interval: 50 ns to 1 ms, 50 ns steps
External clock input:
- Input format: Non-isolated unbalanced
- Input level: TTL level
- Input resistance: 10 kΩ (typical value (see Note 1))
Connector type: BNC
- Input frequency range: 10 kHz to 20 MHz (continuous clock only)
Minimum pulse width: 20 ns or more for both H and L
Trigger source: Input signal, bus trigger(BUSRG1/BUSRG2) signal of the measuring station, commercial power signal
Bus trigger signal (BUSRG1/BUSRG2) output source:
- Able to output the trigger detected from the input signal
Trigger level:
- Setting range: 5% to 95% of full scale
- Resolution: 0.5% of full scale
- Hysteresis width: 3% or 10% of full scale (typical value (see Note 1))
Trigger type: Edge trigger, window trigger
Amount of pretrigger: 0 to (the record length - 2)
External trigger input:
- Input format: Non-isolated, unbalanced
- Input level: TTL level
- Input resistance: 10 kΩ (typical value (see Note 1))
Connector type: BNC
- Maximum input frequency range: 8 MHz
Minimum pulse width: 20 ns or more for both H and L
Sampling skew between channels:
- Channels in one module: Approx. 1 ns (typical value (see Note 1))
- Channels in adjacent modules: 4 ns (typical value (see Note 1))
General Specifications

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

Warm-up time: At least 30 minutes

Maximum allowable input voltage:
  - Channel input: ±250 V (DC + AC peak) or 177 Vrms
  - External clock input: -3 V to 8 V
  - External trigger input: -3 V to 8V
  (Overvoltage category: CAT I and II)

Operating conditions: Same as those of the measuring station

Storage conditions:
  - Temperature: -20°C to 60°C
  - Humidity: 20% to 80% RH (no condensation)

Power consumption: 10 VA (typical value (see Note 1) at 100 V/50 Hz)

Weight: Approx. 0.7[1.54] kg[1b]

External dimensions: Approx. 33{1.3}(W) × 243{9.54}(H) × 232{9.13}(D) mm{inch} (projections excluded)

Number of used slots: 1

Standard accessories: User’s Manual (1)

Note 1: Typical value represents a typical or average value. It is not strictly guaranteed.

Note 2: Value measured with offset voltage set to 0 V and time base set to internal clock under ambient temperature:23±5°C, ambient humidity: 50±10% RH, after warm-up time has passed and after offset calibration.

Note 3: Value measured with time base set to internal clock under ambient temperature:23±5°C, ambient humidity: 50±10% RH, after warm-up time has passed and after offset calibration.

Note 4: Freerun mode and gate mode are not supported.

AVAILABLE MODELS

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>707116</td>
<td>2-CH, 20 MS/s Digitizer Module</td>
</tr>
</tbody>
</table>

Special Accessories(sold separately)

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Model</th>
<th>Description</th>
<th>Order quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 MHz passive probe</td>
<td>700988</td>
<td>10:1 or 1:1 selectable, 1.5 m</td>
<td>1</td>
</tr>
<tr>
<td>Miniclip converter</td>
<td>B9852CR</td>
<td>Probe accessory (one/unit)</td>
<td>1</td>
</tr>
<tr>
<td>BNC adapter</td>
<td>B9852CS</td>
<td>Probe accessory (one/unit)</td>
<td>1</td>
</tr>
<tr>
<td>Ground lead</td>
<td>B9852CT</td>
<td>Probe accessory (one/unit)</td>
<td>1</td>
</tr>
<tr>
<td>50 Ω terminal</td>
<td>700976</td>
<td>Through-type</td>
<td>1</td>
</tr>
</tbody>
</table>
# Overview

The WE7121 10-MHz function generator module is complete with all of the basic features of a function generator.

The module contains in its flash memory the graphic data for screens used to set such data items as the waveform, output voltage and frequency necessary for module operation. When connected to a personal computer, the module is actuated once it transfers the graphic data to the computer. The module can generate simplified arbitrary waveforms.

## Features
- 1-μHz to 10-MHz oscillation frequency range
- Can generate simple arbitrary waveforms
- Operates in sync with an adjacent WE7121 module

## Performance Specifications

The following performance specifications are attained under standard operating conditions (“General Specifications”).

### Waveform output
- Number of output channels: 1 channel
- Standard output waveforms: Sine wave/square wave (duty cycle fixed at 50%)/triangular wave/ramp wave/pulse wave (duty cycle variable), and inversions of each waveform
- Arbitrary waveform
- Output amplitude resolution: 12 bit
- Memory length: 16384 points (some points are not generated when the repetitive frequency is 2.4 kHz or higher.)
- Output operation
  - Continuous oscillation (CONT): Outputs the waveform continuously
  - Trigger oscillation (TRIG): Outputs the specified count (integer) of burst waveforms in sync with the trigger.
  - Gate oscillation (GATE): Outputs the integer count of burst waveforms while the gate is enabled.
- DC output (DC): Outputs a DC voltage.
- Oscillation frequency range
  - Sine/Square wave: 1 μHz to 10 MHz
  - Triangular/Pulse wave: 1 μHz to 200 kHz
  - Ramp wave: 1 μHz to 200 kHz
- Arbitrary waveform: 1 μHz to 200 kHz
- Oscillation frequency resolution: 1 μHz or 9 digits maximum
- Oscillation frequency accuracy: ±20 ppm
- Oscillation frequency stability: ±20 ppm (when ambient temperature is 5 to 40°C)
- Oscillation reference clock: 40.2107 MHz

### Output characteristics
- Maximum output voltage (see Note 1): ±10 V
- Amplitude setting range (see Note 1): 20 Vp-p (resolution: 1 mVp-p)
- Amplitude accuracy (see Note 1) (for 1 kHz sine wave): ±(0.5% of set value + 14 mV)
- Oscillation frequency characteristics (see Note 2)
  - Sine wave
    - ≤ 100 kHz: ±0.1 dB
    - ≤ 1 MHz: ±0.2 dB
    - ≤ 10 MHz: ±0.5 dB
  - Square/Pulse wave (duty cycle 50%): ≤ 10 kHz: ±2%
  - Triangular wave: ≤ 10 kHz: ±3%
  - Ramp wave: ≤ 10 kHz: ±3%
- Offset voltage setting range (see Note 1): ±10 V (resolution: 1 mV)
- Offset voltage accuracy (see Note 1): ±(0.3% of set value + 0.2% of set amplitude + 20 mV)
- DC output setting range (see Note 1): ±10 V (resolution: 1 mV)
- DC output accuracy (see Note 1): ±(0.3% of set value + 20 mV)
- Output impedance: 50 Ω ±1%, except open when the output is turned OFF
- Maximum output current: ±200 mA
- Output format: Non-isolated unbalanced
- Connector type: BNC

Note 1: Value under high impedance load.
Note 2: Amplitude 20 Vp-p, offset voltage 0 V, 50 Ω load, measures RMS value with 1 kHz as a reference.
Sine wave purity
Harmonics (see Note) (Maximum value of the 2nd to 5th order harmonic components)
100 kHz: –55 dBc or less
1 MHz: –45 dBc or less
10 MHz: –35 dBc or less
Harmonic distortion (see Note) (RMS value of 2nd to 5th order harmonic components)
100 kHz: 0.3% or less
Spurious response (see Note) (frequency range 1 kHz to 100 MHz)
100 kHz: –55 dBc or less
Note: Measured with 20 Vp-p amplitude, 0 V offset voltage, 50 Ω load.

Characteristics of sine, pulse, triangular waves
Rise time (see Note)
Square wave: 30 ns or less (10% - 90%)
Pulse wave: 100 ns or less (10% - 90%)
Overshoot (see Note): ±5% or less of the output p-p value
Duty cycle setting (pulse wave only)
Setting range: 0 to 100% (resolution: 0.01% or 25 ns)
Time accuracy (≤10 kHz): ±0.2% of (1/set frequency)
Jitter: 1 clock cycle
Note: Measured with 20 Vp-p amplitude, 0 V offset voltage, 50 Ω load.

Phase
Target: Start/stop phase when using trigger/gate oscillation
Setting range: –10000 deg to +10000 deg (resolution: 0.01 deg)

Trigger/Gate
Trigger source: Internal trigger, Bus trigger (BUSTRG1/BUSTRG2) signal on WE bus
Setting range of internal trigger frequency: 1 MHz to 50 kHz (resolution: 0.01 MHz)
Bus trigger (BUSTRG1/BUSTRG2) signal output source:
Able to output waveform synchronization output (SYNC) signal
Setting range of burst count: 1 to 65535 counts (step: 1)
Gate source: Bus trigger (BUSTRG1/BUSTRG2) signal on the WE bus

Synchronous operation
Skew between modules (when modules are linked and outputting the pulse wave): 70 ns per module (Typical value (see Note 1))
Isolation between channels (see Note 2) (when modules are linked): –65 dB (Typical value (see Note 1))

Note 1: Typical value represents a typical or average value. It is not strictly guaranteed.
Note 2: Output waveform: Cross talk for a 10 MHz sine wave with 20 Vp-p amplitude, 0 V offset voltage, 50 Ω load.

Specifications of the Auxiliary Output
Waveform synchronization signal output (SYNC OUT)
Output level: TTL level, under high impedance load
Output impedance: Approx. 50 Ω
Output current: ±3.2 mA
Output format: Non-isolated unbalanced
Connector type: BNC

General Specifications
Standard operating conditions
Ambient temperature: 23 ±2°C, Ambient humidity: 50 ±10% RH, Error on supply voltage/frequency: within 1% of rating, after the warm-up time has passed
Warm-up time: At least 30 minutes
Operating conditions: Same as that of the measuring station
Storage conditions
Temperature: –20°C to 60°C
Humidity: 20% to 80% RH (no condensation)
Power consumption: 7 VA (Typical value at 100 V/50 Hz (see Note))
External dimensions: Approx. 33(1.3) (W) × 243(9.54) (H) × 232(9.12) (D) mm (inch) (projections excluded)
Weight: Approx. 0.7(1.54) kg (lb)
Number of dedicated slots: 1
Standard accessory: User’s Manual (1)
Optional accessory
366924 BNC cable (1 m)
366925 BNC cable (2 m)
366926 BNC alligator clip cable (1 m)
366921 Adapter (BNC plug-banana terminal jack)
366927 Adapter (BNC plug-RCA jack)
366928 Adapter (BNC jack-RCA plug)

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

AVAILABLE MODEL

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>707121/HE</td>
<td>10 MHz Function Generator Module</td>
</tr>
</tbody>
</table>

Dimensions
Unit: mm (inch)
WE7141
100 MHz Universal Counter Module

- **Overview**
  
  The WE7141 is a universal counter module with a limited range of basic functions. Its flash memory contains setup information required for module operations, such as ranges and gate times. The setup information is transferred to the PC when the module is connected.

- **Features**
  
  - Measurement of frequencies from 1 Hz to 120 MHz
  - Wide variety of measurement functions (time interval, pulse width, duty factor, totalization, etc.)
  - D/A output function
  - Auto-trigger function

- **Input Section Specifications**
  
  - Number of input channels: 2 (A, B)
  - Input format: Non-isolated unbalanced
  - Connector type: BNC
  - Input impedance: 1 MΩ, 40 pF (Typical value (see Note 1))
  - Input coupling: DC, AC
  - Low frequency: –3 dB point during AC coupling: 35 Hz (Typical value (see Note 1))
  - Attenuator: ×1, ×10
    - Trigger level: When the attenuator is set to ×1: –5 V to +5 V (resolution: 20 mV)
      - Setting accuracy (see Note 2): ±10% ±30 mV of the set value (When the attenuator is set to ×1)
    - Trigger slope: Rise, Fall
    - Auto trigger: Automatically set to the center value of the input amplitude

- **Specifications for Individual Measurement Functions**
  
  **Frequency A**
  
  - Measurement range: 1 Hz to 120 MHz (when using 1/2 prescaler), 1 mHz to 60 MHz
  - Gate time (see Note 1)
    - When using prescaler: 10 ms, 100 ms, 1 s, 10 s
    - When not using prescaler: 10 ms, 100 ms, 1 s, 10 s, CH B gate (channel B pulse width)
  - Resolution:
    - Measurement frequency (Hz)
    - Accuracy (see Note 2): Resolution ±(time-base aging × measurement frequency) [Hz]
  
  **Period A**
  
  - Measurement range: 20 ns to 999.999999 s
  - Multiplier: 1, 10, 100, 1000
  - Resolution
    - Measurement period (s)

  **Time Interval A → B**
  
  - Measurement range: 60 ns to 999.999999 s
  - Input frequency range: 1 mHz to 50 MHz (for input channels A and B)
• Multiplier: 1, 10, 100, 1000
• Measurement suspension time: 200 ns (when multiplier = 10, 100, 1000)
• Resolution:
\[ \pm 10 \text{ ns} \pm \text{Channel A input trigger error} = \pm \text{Channel B input trigger error} \]
\[ \pm \left( \frac{10^6}{10} \right)^{1/2} \text{ (s)} \]
\[ \text{(10^6 denotes the multiplier (N = 0, 1, 2, 3).)} \]
• Accuracy (see Note 2): Resolution ±(Time base aging x measurement time) ± trigger level timing error (see Note 4) ± 10 ns error between channels (see Note 5)

**Pulse Width A**
• Measurement range: 20 ns to 999.9999999 s
• Multiplier: 1, 10, 100, 1000
• Resolution:
\[ \pm 10 \text{ ns} \pm \text{Rising edge trigger error} = \pm \text{Falling edge trigger error} \]
\[ \pm \left( \frac{10^6}{10} \right)^{1/2} \text{ (s)} \]
\[ \text{(10^6 denotes the multiplier (N = 0, 1, 2, 3).)} \]
• Accuracy (see Note 2): Resolution ±(Time base aging x measurement time) ± trigger level timing error (see Note 4)

**Duty Cycle A**
• Measurement range: 0.000000001 to 0.999999999 s
• Input range: 20 ns to 999.9999999 s
• Multiplier: 1, 10, 100, 1000
• Displayed units: Value is displayed as a ratio (50% is displayed as 0.5)
• Resolution:
\[ \pm \frac{\text{Pulse width} + \text{Pulse width resolution}}{\text{Period} – \text{Period resolution} – \text{measured duty value}} \]
• Accuracy (see Note 2): Resolution ±(Time base aging x measurement time) ± trigger level timing error (see Note 4)

**Frequency Ratio A/B**
• Measurement range: 0.001 to 999999999 (When multiplier = 1, 0 is displayed when frequency A < B)
• Input range: 1 MHz to 60 MHz
• Multiplier: 1, 10, 100, 1000
• Resolution:
\[ \pm \frac{\text{Pulse width} + \text{Pulse width accuracy}}{\text{Period} – \text{Period accuracy} – \text{measured duty value}} \]
• Accuracy (see Note 2): Resolution ±(Time base aging x measurement time) ± trigger level timing error (see Note 4)

**Continuous Measurement**
• Sampling interval: 10 ms to 100000 s (see Note 6)
  10 ms step
• Trigger output mode: Rise / Fall / In / Out

Note 1: When one period of the input frequency is greater than or equal to the set gate time, the gate time is the time over one period of the input signal.
Note 2: Values obtained under standard operating conditions. Values outside the measurement range are not guaranteed.

---

**External Input/Output Specifications**

**D/A Output**
• Output voltage range: 0 to +10 V (under high impedance load)
  Linear conversion, full scale 15 bit D/A
• Range setting range: Set the maximum and minimum values of the range to perform D/A conversion
  Setting range: 0 to 2^x (except 0 to 10^x on the WE7000 Control Software)
• Maximum output current: ±2 mA
• Output format: Non-isolated unbalanced
• Connector type: BNC

**Reference Time Specifications**
• Internal reference frequency: 10 MHz
• Frequency stability (see Note 1) Aging rate: ±1.5 x 10^-6 /yr
  Temperature characteristics: ±3 x 10^-6 (5°C to 40°C)
• Reference output
  Connector type: BNC
  Output coupling: AC
  Output impedance: 50 Ω (Typical value (see Note 2))
  Output frequency: 10 MHz (Typical value (see Note 2))
  Output level: 1 Vp-p or more (under 50 Ω load)
• External reference input (see Note 1)
  Connector type: BNC
  Input coupling: AC
  Input impedance: 1 kΩ or more
  Input frequency range: 10 MH ±10 Hz
  Input level: 1 Vp-p or more
  Maximum input voltage: ±10 V (Overvoltage Category: CAT I and II)

Note 1: Value or allowed value obtained during standard operating conditions.
Note 2: Typical value represents a typical or average value. It is not strictly guaranteed.
General Specifications

- Standard operating conditions
  Temperature: 23 ±2°C, humidity: 50 ±10% RH,
  Power voltage/frequency error: within 1% of rating, after
  the warmup time has passed
- Warmup time: At least 30 minutes
- Operating conditions: Same as those of the measuring
  station
- Storage conditions
  Temperature: –20 to 60°C
  Humidity: 20 to 80% RH
- Power consumption: 6 VA (Typical value at 100 V/50 Hz
  (see Note))
- External dimensions: Approx. 33{1.30} (W) × 243{9.57}
  (H) × 232{9.13} (D) mm{inch} (projections excluded)
- Weight: Approx. 0.7 {1.54} kg{lb}
- Number of used slots: 1
- Standard accessory: User’s Manual (1)

Optional accessories
700976  50 Ω terminator
366921  Adapter (BNC plug - banana terminal jack)
366923  Connection adapter (T-shaped BNC)
366924  BNC cable (1 m (3.28 ft))
366925  BNC cable (2 m (6.56 ft))
366926  BNC alligator clip cable (1 m (3.28 ft))

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

AVAILABLE MODEL

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>707141/HE</td>
<td>100 MHz Universal Counter Module</td>
</tr>
</tbody>
</table>

Dimensions

Unit: mm (inch)
WE7235
4-CH 100 kS/s Accelerometer Module

■ Overview
The WE7235 4-CH 100kS/s Accelerometer module can measure the acceleration in combination with sensors. This module can be directly connected to low impedance type (built-in amplifier type) accelerometer. This module also can be connected to high impedance type accelerometer by using a charge converter. Equipped with four A/D converters, each module can sample data through four channels simultaneously at 100 kHz. Besides, this module can measure DC voltage.

■ Features
• 100-kS/s sampling and 16-bit A/D conversion on all four channels simultaneously
• Acceleration measurement
  Gain: ×1 to ×100 (1-2-5 steps)
  Drive current supply: 4mA DC
• DC voltage measurement
  Range: ±50mV to ±50V (1-2.5-5 steps)
• Built-in 4MWords acquisition memory
• Operates in sync with an adjacent WE7235 module

■ Performance Specifications
Number of Input Channels: 4
Input Format: Non-isolated unbalanced input
Connector Type: BNC
Measurement Mode: Acceleration measurement and voltage measurement
Input Coupling
  When measuring acceleration: AC only
  When measuring voltage: DC and AC
A/D Resolution: Equivalent to 16 bits (including the sign)
Input Impedance: Approx. 1 MΩ
Allowable Signal Resistance: 100 Ω or less
Frequency Characteristics (When Filter is OFF)
  During DC coupling: DC to 40 kHz (–1.5 dB typical value (see Note 1))
  During AC coupling: 0.1 Hz to 40 kHz (–1.5 dB typical value (see Note 1))
Input Filter
  Low-pass Filter
    Characteristics: 4th order Butterworth (–24 dB/oct)
    Cut-off frequency: 40 Hz/100 Hz/400 Hz/1 kHz/4 kHz/10 kHz/40 kHz (3 dB, typical value (See Note 1))
  Anti-Aliasing Filter
    Characteristics: 8th order Cauer
    Cut-off frequency: 20 Hz/40 Hz/80 Hz/200 Hz/400 Hz/800 Hz/2 kHz/4 kHz/8 kHz/20 kHz/40 kHz
    Pass-band characteristics: 20 Hz to 20 kHz
      ±1 dB at 5 to 100% of the cut-off frequency (typical value (see Note 1))
      ±1 dB at 5 to 50% of the cut-off frequency, –3 dB at 40 kHz (typical value (see Note 1))
    Damping characteristics: 20 Hz
      –50 dB at 2.1 times the cut-off frequency (typical value (see Note 1))
      40 Hz to 40 kHz
        –80 dB at 2.1 times the cut-off frequency (typical value (see Note 1))
Acceleration Measurement
Applicable acceleration sensor: Built-in amplifier type
Sensor supply current: OFF or 4 mA±10%
Sensor supply voltage: OFF or approx. 21 VDC
Sensitivity setting: Enter the acceleration sensor sensitivity on the operation screen (or using the WE Control API (sold separately, model: 707741))
Measurement range: Measurement range automatically set according to the specified acceleration sensor sensitivity.
Amplifier gain and accuracy (when filter is OFF with 1-kHz input under standard operation condition):

<table>
<thead>
<tr>
<th>Gain</th>
<th>Accuracy (See Note 2)</th>
<th>Temperature Coefficient (at 5 to 18°C and 28 to 40°C) (See Note 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>×1</td>
<td>±(0.5% of Full Scale)</td>
<td>±(0.01% of Full Scale)°C</td>
</tr>
<tr>
<td>×2</td>
<td>±(0.5% of Full Scale)</td>
<td>±(0.01% of Full Scale)°C</td>
</tr>
<tr>
<td>×5</td>
<td>±(0.5% of Full Scale)</td>
<td>±(0.01% of Full Scale)°C</td>
</tr>
<tr>
<td>×10</td>
<td>±(0.5% of Full Scale)</td>
<td>±(0.02% of Full Scale)°C</td>
</tr>
<tr>
<td>×20</td>
<td>±(0.5% of Full Scale)</td>
<td>±(0.02% of Full Scale)°C</td>
</tr>
<tr>
<td>×50</td>
<td>±(0.5% of Full Scale)</td>
<td>±(0.03% of Full Scale)°C</td>
</tr>
<tr>
<td>×100</td>
<td>±(0.5% of Full Scale)</td>
<td>±(0.05% of Full Scale)°C</td>
</tr>
</tbody>
</table>

Voltage Measurement: Voltage range and DC accuracy (under standard operating condition):

<table>
<thead>
<tr>
<th>Measurement Range</th>
<th>DC Accuracy</th>
<th>Temperature Coefficient (at 5 to 18°C and 28 to 40°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>±50 mV</td>
<td>±(0.15% of rdg +0.5 mV)</td>
<td>±(90ppm + 20µV)V°C</td>
</tr>
<tr>
<td>±100 mV</td>
<td>±(0.15% of rdg +0.5 mV)</td>
<td>±(180ppm + 40µV)V°C</td>
</tr>
<tr>
<td>±250 mV</td>
<td>±(0.15% of rdg +0.5 mV)</td>
<td>±(450ppm + 100µV)V°C</td>
</tr>
<tr>
<td>±500 mV</td>
<td>±(0.05% of rdg +2 mV)</td>
<td>±(880ppm + 200µV)V°C</td>
</tr>
<tr>
<td>±1 V</td>
<td>±(0.05% of rdg +8 mV)</td>
<td>±(110ppm + 400µV)V°C</td>
</tr>
<tr>
<td>±2.5 V</td>
<td>±(0.05% of rdg +18 mV)</td>
<td>±(150ppm + 600µV)V°C</td>
</tr>
<tr>
<td>±5 V</td>
<td>±(0.05% of rdg +35 mV)</td>
<td>±(190ppm + 1mV)V°C</td>
</tr>
</tbody>
</table>

Measurement range and AC accuracy (when filter is OFF with 1-kHz input under standard operation condition):

<table>
<thead>
<tr>
<th>Measurement Range</th>
<th>AC Accuracy (See Note 2)</th>
<th>Temperature Coefficient (at 5 to 18°C and 28 to 40°C) (See Note 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>±50 mV</td>
<td>±(0.5% of Full Scale)</td>
<td>±(0.05% of Full Scale)°C</td>
</tr>
<tr>
<td>±100 mV</td>
<td>±(0.5% of Full Scale)</td>
<td>±(0.03% of Full Scale)°C</td>
</tr>
<tr>
<td>±250 mV</td>
<td>±(0.5% of Full Scale)</td>
<td>±(0.02% of Full Scale)°C</td>
</tr>
<tr>
<td>±500 mV</td>
<td>±(0.5% of Full Scale)</td>
<td>±(0.02% of Full Scale)°C</td>
</tr>
<tr>
<td>±1 V</td>
<td>±(0.5% of Full Scale)</td>
<td>±(0.01% of Full Scale)°C</td>
</tr>
<tr>
<td>±2.5 V</td>
<td>±(0.5% of Full Scale)</td>
<td>±(0.01% of Full Scale)°C</td>
</tr>
<tr>
<td>±5 V</td>
<td>±(0.5% of Full Scale)</td>
<td>±(0.01% of Full Scale)°C</td>
</tr>
<tr>
<td>±10 V</td>
<td>±(0.5% of Full Scale)</td>
<td>±(0.01% of Full Scale)°C</td>
</tr>
<tr>
<td>±25 V</td>
<td>±(0.5% of Full Scale)</td>
<td>±(0.01% of Full Scale)°C</td>
</tr>
<tr>
<td>±50 V</td>
<td>±(0.5% of Full Scale)</td>
<td>±(0.01% of Full Scale)°C</td>
</tr>
</tbody>
</table>

Maximum Sampling Rate: 100 kS/s
Internal Time Base: 10 µs to 10 s (1-µs steps)
Time Base Accuracy
When module’s internal clock is selected: Same as the reference clock accuracy of the measuring station (±100 ppm for 707001/707002)
Trigger Source: Input signal (including input signals from other digitizer modules that are linked) or the bus trigger signal (BUSTRG1/BUSTRG2) of the measuring station
Bus Trigger (BUSTRG1/BUSTRG2) Signal Output Source: The trigger detected from the input signal can be output
Trigger Level Resolution
When measuring acceleration
1% of the full-scale value (selectable range: +100% to –100%)
When measuring voltage

<table>
<thead>
<tr>
<th>Measurement Range</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>±50 mV</td>
<td>0.1 mV</td>
</tr>
<tr>
<td>±100 mV</td>
<td>1 mV</td>
</tr>
<tr>
<td>±250 mV</td>
<td>1 mV</td>
</tr>
<tr>
<td>±500 mV</td>
<td>1 mV</td>
</tr>
<tr>
<td>±1 V</td>
<td>10 mV</td>
</tr>
<tr>
<td>±2.5 V</td>
<td>10 mV</td>
</tr>
<tr>
<td>±5 V</td>
<td>10 mV</td>
</tr>
<tr>
<td>±10 V</td>
<td>100 mV</td>
</tr>
<tr>
<td>±25 V</td>
<td>100 mV</td>
</tr>
<tr>
<td>±50 V</td>
<td>100 mV</td>
</tr>
</tbody>
</table>

Hysteresis width: 3% of (upper limit of range – lower limit of range) (typical value (see Note 1))
Setting accuracy: 3% of (upper limit of range – lower limit of range) (typical value (see Note 1))
Trigger Type: Edge trigger, state trigger, and combination trigger (AND/OR of the input signal)
Amount of Pretrigger: Set in the range from 0 to (the record length – 2)
Sensor Connection Test Function: Checks the opened or shortened condition of the sensor (only when acceleration sensors are connected)

Note 1: Typical value represents a typical or average value. It is not strictly guaranteed.
Note 2: The full scale value is the measurement range between 0 and the positive full scale value.
■ General Specifications

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

Warm-up Time: At least 30 minutes

Maximum Allowable Input Voltage: ±60 V (DC + AC peak)

Operating Conditions: Same as those of the measuring station

Storage Conditions
- Temperature: −20°C to 60°C
- Humidity: 20% to 80% RH (no condensation)

Power Consumption: 12 VA (typical value at 100 V/50 Hz (see Note 3))

Weight: Approx. 0.8{1.76} kg {lb}

External Dimensions: Approx. 33{1.3}(W) × 243{9.54}(H) × 232{9.13}(D) mm {inch} (projections excluded)

Number of Used Slots: 1

Standard Accessories: User’s Manual (this manual) (1)

Note 3: Typical value represents a typical or average value. It is not strictly guaranteed.

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>707235/HE</td>
<td>4-CH, 100 kS/s Accelerometer Module</td>
</tr>
</tbody>
</table>

■ Dimensions

![Dimensions Diagram]
Overview
The WE7241 multiplexes 10 channels of thermocouple or voltage inputs, enabling measurements with periods as short as 0.5 second. Its internal flash memory contains setup information required for module operations, such as ranges and measurement periods. Setup information set on this screen is transferred to the PC when the module is connected.

Features
- Thermocouple measurement with reference junction compensating circuit
- 10-channel multiplexed input
- Isolation between channels

Functions
- Synchronized operations between adjacent WE7241 modules
- 50/60 Hz noise is removed by a digital filter.

Performance Specifications
- Number of input channels: 10
- Input format: Floating unbalanced input (multiplexer format), isolation between channels and between the input and ground
- Measurement range/accuracy (ambient temperature 23 ±5°C, ambient humidity 50 ±10% RH, after the warmup time has passed)

<table>
<thead>
<tr>
<th>DC Voltage Input Range</th>
<th>Setting Accuracy</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 mV</td>
<td>±(0.07% of rdg + 40 µV)</td>
<td>10 µV</td>
</tr>
<tr>
<td>100 mV</td>
<td>±(0.06% of rdg + 60 µV)</td>
<td>10 µV</td>
</tr>
<tr>
<td>200 mV</td>
<td>±(0.06% of rdg + 80 µV)</td>
<td>10 µV</td>
</tr>
<tr>
<td>500 mV</td>
<td>±(0.06% of rdg + 200 µV)</td>
<td>100 µV</td>
</tr>
<tr>
<td>1 V</td>
<td>±(0.06% of rdg + 400 µV)</td>
<td>100 µV</td>
</tr>
<tr>
<td>2 V</td>
<td>±(0.06% of rdg + 600 µV)</td>
<td>100 µV</td>
</tr>
<tr>
<td>5 V</td>
<td>±(0.2% of rdg + 2 mV)</td>
<td>1 mV</td>
</tr>
<tr>
<td>10 V</td>
<td>±(0.2% of rdg + 3 mV)</td>
<td>1 mV</td>
</tr>
<tr>
<td>20 V</td>
<td>±(0.2% of rdg + 5 mV)</td>
<td>1 mV</td>
</tr>
<tr>
<td>50 V</td>
<td>±(0.2% of rdg + 20 mV)</td>
<td>10 mV</td>
</tr>
</tbody>
</table>

- Temperature coefficient (at 5 to 18°C or 28 to 40°C): ±100 ppm of rdg)°C

<table>
<thead>
<tr>
<th>Thermocouple Input Type</th>
<th>Accuracy Guaranteed Measurement Range</th>
<th>Accuracy</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>−200.0 to 1300.0°C</td>
<td>±(0.1% of rdg + 1°C), except 0.1°C</td>
<td>200°C to 0°C: ±(0.6% of rdg + 1°C)</td>
</tr>
<tr>
<td>E</td>
<td>−200.0 to 800.0°C</td>
<td>±(0.05% of rdg + 1°C), except 0.1°C</td>
<td>200°C to 0°C: ±(0.3% of rdg + 1°C)</td>
</tr>
<tr>
<td>J</td>
<td>−200.0 to 1100.0°C</td>
<td>±(0.1% of rdg + 1°C), except 0.1°C</td>
<td>200°C to 0°C: ±(0.4% of rdg + 1°C)</td>
</tr>
<tr>
<td>T</td>
<td>−200.0 to 400.0°C</td>
<td>±(0.01% of rdg + 1°C), except 0.1°C</td>
<td>200°C to 0°C: ±(0.4% of rdg + 1°C)</td>
</tr>
</tbody>
</table>

- Temperature coefficient (at 5 to 18°C or 28 to 40°C): ±(200 ppm of rdg)°C
- L: U: DIN 43710
- W: ASTM 988-84
- KPxAu7Fe: ASTM SPT430
- Reference Junction Compensation Accuracy (using 707821, when the temperature of the input terminal is balanced, excluding noise components)
- When measuring above 0°C: ±1°C, when measuring below 0°C: ±1.5°C
- No guarantees on accuracy during KPxAu7Fe measurement
- For Type-W when measuring up to 200°C: ±1°C, when measuring above 200°C: ±1.5°C
- No reference junction compensation for Type-B
- Input coupling method: DC
- Input resistance: 1 MΩ or more
- Maximum source resistance: 1 kΩ or less
- Normal mode rejection ratio (when the frequency is 50/60 Hz ±0.1 Hz): 50 dB or more
- Common mode rejection ratio (when the frequency is 50/60 Hz ±0.1 Hz): 120 dB or more (when using the guard)
• A/D resolution: Equivalent to 14 bits (when applying DC voltage)
• Time base: Module’s internal clock, or the time base (CMNCLK) signal of the measuring station
• Sampling interval
  When using the internal time base: 0.5 s to 60 s
  When using the time base (CMNCLK) signal of the measuring station: 2.0 s or longer
• Connector type: DIN connector (96-pin, male)

■ General Specifications

• Safety standard: Conforms to CSA C22.2 No. 1010.1 and EN61010-1, conforms to JIS C1004
• Warm-up time: At least 30 minutes
• Operating conditions: Same as those of the measuring station
• Storage conditions
  Temperature: –20 to 60°C
  Humidity: 20 to 80% RH (no condensation)
• Maximum allowable input voltage: 30 VACrms, 42.4 Vpeak or ±60 VDC (Overvoltage Category: CAT I and II)
• Maximum common mode voltage: 150 Vrms or ±150 VDC between the L terminal and ground
• Maximum noise between channels: 60 VACrms, 84.8 Vpeak or ±100 VDC
• Insulation withstand voltage
  Between input terminals: 60 Hz 1000 VACrms for one minute
  Between input terminal and ground: 60 Hz 1500 VACrms for one minute
• Insulation resistance
  Between input terminal and ground, between input terminals: 500 VDC, 10 MΩ or more
• Power consumption: 7 VA (typical value (see Note) at 100 V/50 Hz)
• External dimensions: Approx. 33{1.30} (W) × 243{9.57} (H) × 227{8.94} (D) mm{inch} (projections excluded)
• Weight: Approx. 0.8{1.76} kg{lb}
• Number of used slots: 1
• Standard accessory: User’s Manual (1)
• Optional accessory
  707821  Input terminal block

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

### AVAILABLE MODEL

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>707241/HE</td>
<td>10-CH, Digital Thermometer Module</td>
</tr>
</tbody>
</table>

### Special Accessory (sold separately)

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Model</th>
<th>Specifications</th>
<th>Order quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input terminal block</td>
<td>707821</td>
<td>Temperature and voltage measurement</td>
<td>1</td>
</tr>
</tbody>
</table>
Overview
The WE7245 4-channel 100-kS/s Strain module can convert 4 channels’ worth of analog signals to digital signals at a maximum speed of 100 kHz. Equipped with four A/D converters and strain amplifier, each module can sample data through four channels simultaneously at 100 kHz. By being distorted with the bridge of outside attachment and connecting a gauge, strain can be measured. The input channels are isolated from each other, as well as from the ground.

Features
- 4CH simultaneous sampling
- Strain measurement (±1000 µ to ±20000 µ)
- Voltage measurement (±100 mV to ±20 V)
- Highest sampling speed: 100 kS/s
- Isolation between inputs and between inputs and ground.

Performance Specifications
Number of Input Channels: 4
Input Format: Isolated differential input (strain measurement), isolated unbalanced input (voltage measurement), isolation between channels and between the input and ground (strain and voltage measurement)
Frequency Bandwidth: DC to 20 kHz
A/D Resolution: 15 bits (includes the sign)
Allowable Signal Resistance: 1 kΩ less
Input Filter: Low-pass filter, filter can be turned ON/OFF
Cut-off frequency: 10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, OFF (20 kHz) (Typical value (see Note))
Cut-off characteristics: –18 dB/octave
Input Terminal: D-sub 9-pin connector (female)

Strain Measurement
Measurement range/Accuracy (Ambient temperature: 23 ± 5°C Ambient humidity: 50 ± 10% RH, after the warm-up time has passed, filter is 10 Hz, after balancing, measurement range is for when the gauge factor is 2)

<table>
<thead>
<tr>
<th>Setting</th>
<th>Measurable Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 × 10⁻⁸ strain</td>
<td>±1000 × 10⁻⁸ strain</td>
</tr>
<tr>
<td>2000 × 10⁻⁸ strain</td>
<td>±2000 × 10⁻⁸ strain</td>
</tr>
<tr>
<td>5000 × 10⁻⁸ strain</td>
<td>±5000 × 10⁻⁸ strain</td>
</tr>
<tr>
<td>10000 × 10⁻⁸ strain</td>
<td>±10000 × 10⁻⁸ strain</td>
</tr>
<tr>
<td>20000 × 10⁻⁸ strain</td>
<td>±20000 × 10⁻⁸ strain</td>
</tr>
<tr>
<td>0.5 mV/V</td>
<td>±0.5 mV/V</td>
</tr>
<tr>
<td>1 mV/V</td>
<td>±1 mV/V</td>
</tr>
<tr>
<td>2 mV/V</td>
<td>±2 mV/V</td>
</tr>
<tr>
<td>5 mV/V</td>
<td>±5 mV/V</td>
</tr>
<tr>
<td>10 mV/V</td>
<td>±10 mV/V</td>
</tr>
</tbody>
</table>

Accuracy varies depending on the selected bridge voltage as shown below.

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>Temperature Coefficient</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>±(0.25% of rdg + 18 × 10⁻⁴ strain)</td>
<td>±(120 ppm of rdg + 2.4 × 10⁻⁶ strain)°C</td>
<td>When the bridge voltage is 2 V</td>
</tr>
<tr>
<td>±(0.25% of rdg + 36 × 10⁻⁴ strain)</td>
<td>±(120 ppm of rdg + 3.6 × 10⁻⁶ strain)°C</td>
<td>When the bridge voltage is 5 V</td>
</tr>
<tr>
<td>±(0.25% of rdg + 84 × 10⁻⁴ strain)</td>
<td>±(120 ppm of rdg + 8.4 × 10⁻⁶ strain)°C</td>
<td>When the bridge voltage is 10 V</td>
</tr>
</tbody>
</table>

Applicable Gauge Resistance:
- 120 to 1000 Ω (bridge voltage 2 V)
- 350 to 1000 Ω (bridge voltage 5 or 10 V)

Gauge Factor: 2

Balancing Method
Electronic auto balance
Balance range: ±10000 µstrain (Typical value (see Note))

Balance mode: All channels at once
Shunt Calibration: Built-in relay contact for shunt calibration
Voltage Measurement

Measurement range/Accuracy (Ambient temperature: 23 ± 5°C, Ambient humidity: 50 ± 10% RH, after the warm-up time has passed, filter is 10 Hz)

<table>
<thead>
<tr>
<th>Setting Range</th>
<th>Measurable Range</th>
<th>Accuracy</th>
<th>Temperature Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 mV</td>
<td>±100 mV</td>
<td>±(0.06% of rdg + 0.4 mV/V)/°C</td>
<td>±(60 ppm of rdg + 48 μV/V)°C</td>
</tr>
<tr>
<td>200 mV</td>
<td>±200 mV</td>
<td>±(0.06% of rdg + 0.4 mV/V)/°C</td>
<td>±(60 ppm of rdg + 48 μV/V)°C</td>
</tr>
<tr>
<td>500 mV</td>
<td>±500 mV</td>
<td>±(0.06% of rdg + 0.4 mV/V)/°C</td>
<td>±(60 ppm of rdg + 48 μV/V)°C</td>
</tr>
<tr>
<td>1 V</td>
<td>±1 V</td>
<td>±(0.06% of rdg + 0.4 mV/V)/°C</td>
<td>±(60 ppm of rdg + 48 μV/V)°C</td>
</tr>
<tr>
<td>2 V</td>
<td>±2 V</td>
<td>±(0.06% of rdg + 0.6 mV/V)/°C</td>
<td>±(60 ppm of rdg + 48 μV/V)°C</td>
</tr>
<tr>
<td>5 V</td>
<td>±5 V</td>
<td>±(0.06% of rdg + 1.0 mV/V)/°C</td>
<td>±(60 ppm of rdg + 48 μV/V)°C</td>
</tr>
<tr>
<td>10 V</td>
<td>±10 V</td>
<td>±(0.06% of rdg + 2.0 mV/V)/°C</td>
<td>±(60 ppm of rdg + 48 μV/V)°C</td>
</tr>
<tr>
<td>20 V</td>
<td>±20 V</td>
<td>±(0.06% of rdg + 6.0 mV/V)/°C</td>
<td>±(60 ppm of rdg + 48 μV/V)°C</td>
</tr>
</tbody>
</table>

Acquisition Method
Trigger, free run, gate (level), gate (edge)
Memory Length of Acquisition Memory: 4 MWords
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/CH (when using 3CH/4CH)
- 2 MWords/CH (when using 2CH)
- 4 MWords/CH (when using 1CH)
Time Base Source
- Module’s internal clock or the time base signal (CMNCLK) of the measuring station
Trigger Source
- Input signal (AND/OR between channels is possible) or the bus trigger (BUSTRG1/BUSTRG2) signal of the measuring station
Trigger Level Resolution
When measuring the strain:
- 100 μSTR at ±20000 μSTR/±10000 μSTR range, 10 μSTR at ±5000 μSTR/±2000 μSTR/±1000 μSTR range 0.1 mV/V at ±10 mV range, 0.01 mV/V at ±5 mV/V at ±2.5 mV/V/±1 mV/V range, 0.001 mV/V at ±0.5 mV/V range
When measuring the voltage:
- 1 mV at ±100 mV/±200 mV/±500 mV range, 10 mV at ±1 V/±2 V/±5 V range, 100 mV at ±10 V/±20 V range
Hysteresis width
- 3% of (upper limit of range - lower limit of range) (Typical value (see Note))
Setting Accuracy
- 3% of (upper limit of range - lower limit of range) (Typical value (see Note))
Amount of Pretrigger
- Set in the range from 0 to (the record length – 2)

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

■ General Specifications
Safety Standard: Complies with CSA C22.2 No.1010.1 and EN61010-1, conforms to JIS C1010-1
Warm-up Time: At least 30 minutes
Maximum Allowable Input Voltage: ±30 V (DC + ACpeak)
Maximum Floating Voltage: 30 VACrms, 42.4 Vpeak or 60 VDC (Overtoltage Category: CAT I and II) Between the common terminal of each channel and the case and between input channels for all voltages above
Common Mode Rejection Ratio:
- Strain measurement range: 80 dB or greater (converted to voltage when the bridge voltage is 2 V and the gauge factor is 2)
Voltage range: 65 dB or greater
Signal source resistance of 1 kΩ or less between the input terminal and the case at 50/60 Hz
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: 15 VA (typical value at 100 V/50 Hz)
External Dimensions: Approx. 33{1.30} (W) × 232{9.13} (H) × 243{9.57} (D) mm [inch] (projections excluded)
Weight: Approx. 1{2.2} kg [lb]
Number of Used Slots: 1
Standard Accessories: D-Sub 9-pin connector (male) (4), Clamp filter (4), User’s Manual (1)

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

Available Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>707245/HE</td>
<td>4-CH, 100 kS/s Strain Module</td>
</tr>
</tbody>
</table>

Special Accessories (sold separately)

<table>
<thead>
<tr>
<th>Accessory Model Description</th>
<th>Order Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge head 700932/WE 120 Ω, 5 m</td>
<td>1</td>
</tr>
<tr>
<td>Bridge head 700933/WE 350 Ω, 5 m</td>
<td>1</td>
</tr>
<tr>
<td>Bridge head 700967 120 Ω, 5 m, With Shunt Cal</td>
<td>1</td>
</tr>
<tr>
<td>Bridge head 700968 150 Ω, 5 m, With Shunt Cal</td>
<td>1</td>
</tr>
</tbody>
</table>
## Accessories (sold separately)

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Model</th>
<th>Description</th>
<th>Order quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O connector (cover)</td>
<td>A1618JD</td>
<td>D-sub (9 pin)</td>
<td>1</td>
</tr>
<tr>
<td>I/O connector (cover)</td>
<td>A1520JD</td>
<td>D-sub (9 pin)</td>
<td>1</td>
</tr>
</tbody>
</table>

### Dimensions

[Diagram showing dimensions]

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Unit: mm (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>33 (1.3)</td>
<td></td>
</tr>
<tr>
<td>227 (8.94)</td>
<td></td>
</tr>
<tr>
<td>4.5 (0.18)</td>
<td></td>
</tr>
<tr>
<td>242.4 (9.54)</td>
<td></td>
</tr>
<tr>
<td>227 (8.94)</td>
<td></td>
</tr>
</tbody>
</table>
WE7251
10-CH, 100 kS/s Digitizer Module

■ Overview
The WE7251 is a digitizing module which scans 10 analog input channels using a multiplexer. It is capable of A/D conversion at a maximum frequency of 100 kHz (when scanning a single channel). Its flash memory contains setup information required for module operations, such as ranges and sampling rates. Setup information is transferred to the PC when the module is connected. The signal connection process is easy with the special terminal block accessory. Multiple WE7251 modules can be installed next to each other to synchronize their operations. The WE7251 also supports a trigger function which allows data preceding and following an event to be collected.

■ Features
- 10-channel multiplexed input
- 100 kS/s, 16-bit A/D conversion
- Built-in acquisition memory with 1 MWords capacity
- Synchronized operations between adjacent WE7251 modules
- Trigger function which allows data preceding and following an event to be collected

■ 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 MΩ
- 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 (see Note))
- Measurement range/Accuracy (Ambient temperature: 23 ±5°C, Ambient humidity: 50 ±10% RH, after the warmup time has passed)

<table>
<thead>
<tr>
<th>Range</th>
<th>Accuracy</th>
<th>Temperature coefficient (at 5-18°C, 28-40°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>±1 V</td>
<td>±(0.05% of rdg + 1 mV)</td>
<td>±(50 ppm of rdg + 70 mV)/°C</td>
</tr>
<tr>
<td>±2 V</td>
<td>±(0.05% of rdg + 1.6 mV)</td>
<td>±(50 ppm of rdg + 0.1 mV)/°C</td>
</tr>
<tr>
<td>±5 V</td>
<td>±(0.05% of rdg + 3.2 mV)</td>
<td>±(50 ppm of rdg + 0.18 mV)/°C</td>
</tr>
<tr>
<td>±10 V</td>
<td>±(0.07% of rdg + 10 mV)</td>
<td>±(70 ppm of rdg + 0.7 mV)/°C</td>
</tr>
<tr>
<td>±20 V</td>
<td>±(0.07% of rdg + 20 mV)</td>
<td>±(70 ppm of rdg + 1.0 mV)/°C</td>
</tr>
</tbody>
</table>

- 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 × 10 μs (when the filter is turned OFF)
- Internal time base: When the filter is turned OFF: 10 μs to 10 s, When the filter is turned ON: 10 ms to 10 s
- Trigger source: Input signal (includes input signals of other digitizer modules that are linked), or the bus trigger (BUSTRG1/BUSTRG2) 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 ±1/2/5 V range, 100 mV at ±10/20 V range (Typical value (see Note))
  Hysteresis width: 0.8% of (upper limit of range – lower limit of range) (Typical value (see Note))
  Measurement accuracy: 0.2% of ±(upper limit of range – lower limit of range)
- Trigger type: Edge trigger, state trigger, window trigger, combination trigger (AND/OR of the input signals)
- Amount of pre-trigger: Set 0 to 100% of the record length
- Connector type: DIN connector (96 pins, male)

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

■ General Specifications
- Safety standard: Conforms to CSA C22.2 No. 1010.1 and EN61010-1, conforms to JIS C1004
- Warm-up time: At least 30 minutes
- Maximum allowable input voltage: 30 VACms, 42.4 Vpeak or ±60 VDC (Overvoltage Category: CAT I and II)
- Maximum common mode voltage: 100 Vrms or ±100 VDC between the L terminal and ground
- Insulation withstand voltage
  Between input terminal and ground: 60 Hz 1000 VACms for one minute
• Insulation resistance
  Between input terminal and ground: 500 VDC, 10 MΩ or more
• Operating conditions: Same as those of the measuring station
• Storage conditions
  Temperature: –20 to 60°C
  Humidity: 20 to 80% RH
• Power consumption: 8 VA (typical value (see Note) at 100 V/50 Hz)
• External dimensions: Approx. 33{1.30} (W) × 243{9.57} (H) × 232{9.13} (D) mm (inch) (projections excluded)
• Weight: Approx. 0.7{1.54} kg (lb)
• Number of used slots: 1
• Standard accessory: User’s Manual (1)
• Optional accessory
  707821 Input terminal block

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

### AVAILABLE MODEL

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>707251/HE</td>
<td>10-CH, 100 kS/s Digitizer Module</td>
</tr>
</tbody>
</table>

### Special Accessory (sold separately)

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Model</th>
<th>Specifications</th>
<th>Order quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input terminal block</td>
<td>707821</td>
<td>Temperature and voltage measurement</td>
<td>1</td>
</tr>
</tbody>
</table>

### Dimensions

Unit: mm (inch)
WE7262
32-Bit Digital I/O Module

■ Overview

The WE7262 32-bit digital I/O module is used to input or output TTL/CMOS-level digital signals.

The module contains in its flash memory the graphic data for screens used to set such data items as the I/O setpoints necessary for module operation. When connected to a personal computer, the module is actuated once it transfers the graphic data to the computer. In addition, the module is provided with a 2-channel pulse counter. An optional 16-bit I/O terminal box can be connected to the module to enable the module to handle contact I/O signals.

■ Features

• 32-bit non-isolated bi-directional digital I/Os
• Continuous measurement
• 2-channel counter function
• 2MHz maximum input frequency in the counter block
• Detection of input-pattern matches on an 8-bit basis

■ Performance Specifications

Input/Output Section

Number of input/output points: 32 points
Maximum output current: ±3.2 mA
Output voltage
  H level @–3.2 mA: 3.8 V min
  L level @3.2 mA: 0.5 V max
Input voltage
  H level: 2.0 V min
  L level: 0.6 V max
Maximum allowable input voltage: –3 V to +8 V (Over-voltage Category: CAT I and II)
Sampling interval during continuous measurement of input pattern: 10 ms to 10 s
Output impedance Approx. 100 Ω
Input impedance: Approx. 47 kΩ
Input format: Non-isolated unbalanced
Connector type: D-sub type 25 pins (female)
Pattern match detection (see Note 1)
  Detection bit: Compares every 8 bits of input, generates up to 4 interrupts
  Chattering elimination: ON/OFF selectable. When turned ON, eliminates bouncing of frequencies less than or equal to 1 ms

Counter Section

Number of input channels: 2
External input frequency: 2 MHz max
Minimum input pulse width: 100 ns
Input voltage
  H level: 2.0 V min
  L level: 0.4 V max
Maximum allowable input voltage: –3 V to +8 V (Over-voltage category: CAT I and II)
Input impedance: Approx. 47 kΩ
Input format: Non-isolated unbalanced
Maximum number of counts: FFFE0000H (4294836224)
Overflow detection
  Counter overflow detectable
Control (Count enable)
  • Manual gate
  • Internal gate: Control with the timer
    - Selectable range: 1 ms to 600 s
    - Resolution: 0.1 ms
    - Setting accuracy (see Note 2): ±(0.02% of setting + 1 μs)
  • External gate: Control with external signal, H active, common to both input channels
    - Number of inputs: 1
    - Input pulse width: 1 ms or more

Note 1: Not supported by the WE7000 Control Software.
Note 2: Measurement value obtained under standard operating conditions.
**General Specifications**

Standard operating conditions
- **Temperature**: 23°C ±2°C, Humidity: 50 ±10% RH
- **Power voltage/frequency error**: Within 1% of rating, after the warmup time has passed
- **Warmup time**: At least 30 minutes

Operating conditions: Same as those of the measuring station

Storage conditions
- **Temperature**: –20 to 60°C
- **Humidity**: 20 to 80% RH
- **Power consumption**: 1.2 VA (Typical value at 100 V/50 Hz (see Note))
- **External dimensions**: Approx 33{1.3} (W) × 243{9.54} (H) × 232{9.13} (D) mm{inch} (projections excluded)
- **Weight**: Approx. 0.6{1.32} kg{lb}
- **Number of used slots**: 1
- **Standard accessory**: User’s Manual (1), D-sub connector (25 pin, male) (2 pieces)

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

<table>
<thead>
<tr>
<th>AVAILABLE MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>707262/HE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Special Accessory (sold separately)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessory</td>
</tr>
<tr>
<td>16-bit digital input terminal box</td>
</tr>
<tr>
<td>16-bit digital output terminal box</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessory (sold separately)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessory</td>
</tr>
<tr>
<td>I/O connector (cover)</td>
</tr>
<tr>
<td>I/O connector (plag)</td>
</tr>
</tbody>
</table>

**Dimensions**

Unit: mm (inch)

- 33{1.3} (W) × 243{9.54} (H) × 232{9.13} (D)

**I/O Circuit Diagram**
WE7271/WE7272
4-CH, 100 kS/s Isolated Digitizer Module

■ Overview
The WE7271/WE7272 4-channel 100-kS/s isolated digitizer module can convert 4 channels’ worth of analog signals to digital signals at a maximum speed of 100 kHz. Equipped with four A/D converters, each module can sample data through four channels simultaneously at 100 kHz. The input channels are isolated from each other, as well as from the ground.

Each module contains in its flash memory the graphic data for screens used to set such data items as the range and sampling rate necessary for module operation. When connected to a personal computer, the module is actuated once it transfers the graphic data to the computer. In addition, two or more modules can be mounted side by side to enable synchronous operation. These modules support the trigger function that permits you to acquire data before and after the rise of a specific event.

■ Features
- 100-kS/s sampling and 16-bit analog-to-digital conversion on all four channels simultaneously
- Isolation between inputs and between inputs and ground
- Built-in 4MWord acquisition memory
- Operates in sync with an adjacent WE7271/WE7272 module
- Trigger function that allows data immediately before and after the rise of an event, to be acquired correctly
- Input connector
  WE7271: Clamp type terminal
  WE7272: BNC

■ Performance Specifications
Number of input channels: 4
Input format: Floating unbalanced input, isolation between channels and between the input and ground
A/D resolution: 16 bits
Input impedance: Approx. 1 MΩ
Input coupling: DC
Maximum source resistance: 100 Ω or below
Input filter: OFF/5 kHz/500 Hz (typical value (see Note 1) at –3 dB attenuation point)
Frequency characteristics: DC to 40 kHz (typical value (see Note 1) at –1.5 dB attenuation point, with filter turned off)

<table>
<thead>
<tr>
<th>Range</th>
<th>Accuracy (see Note 2)</th>
<th>Temperature coefficient (see Note 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>±1 V</td>
<td>±(0.04% of rdg + 0.4 mV)</td>
<td>±(40 ppm of rdg + 22 μV)/°C</td>
</tr>
<tr>
<td>±2 V</td>
<td>±(0.04% of rdg + 0.6 mV)</td>
<td>±(40 ppm of rdg + 32 μV)/°C</td>
</tr>
<tr>
<td>±5 V</td>
<td>±(0.04% of rdg + 1.3 mV)</td>
<td>±(40 ppm of rdg + 60 μV)/°C</td>
</tr>
<tr>
<td>±10 V</td>
<td>±(0.07% of rdg + 6.5 mV)</td>
<td>±(65 ppm of rdg + 460 μV)/°C</td>
</tr>
<tr>
<td>±20 V</td>
<td>±(0.07% of rdg + 8.7 mV)</td>
<td>±(65 ppm of rdg + 560 μV)/°C</td>
</tr>
<tr>
<td>±35 V</td>
<td>±(0.07% of rdg + 15.5 mV)</td>
<td>±(65 ppm of rdg + 840 μV)/°C</td>
</tr>
</tbody>
</table>

Acquisition method: Trigger, free run, gate (level), gate (edge)
Memory length of acquisition memory: 4 MWords
Memory 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/CH (for 3 CH/4 CH measurement), 2 MWords/CH (for 2 CH measurement), 4 MWords/CH (for 1 CH measurement)
Time base source: Module’s internal clock, or the time base signal (CMNCLK) of the measuring station (WE bus)
Sampling interval: 10 μs to 10 s, 1 ms to 10 s (when in free run mode using WE7000 control software)
Trigger source: Input signal (includes input signals of other isolated digitizer modules that are linked), or the bus trigger (BUSTRG1/BUSTRG2) 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 ±1/2/5 V range, 100 mV at ±10/20/35 V range (Typical value (see Note 1))
Hysteresis width: 0.5% of (upper limit of range – lower limit of range) (Typical value (see Note 1))
Measurement accuracy: 0.5% of (upper limit of range – lower limit of range)
Trigger type: Edge trigger, state trigger, combination trigger (AND/OR of the input signals)
Amount of pre-trigger: Set in the range from 0 to the record length – 2
Connector type:
WE7271: Clamp type terminal (detachable terminal block)
  Recommended stripped length of input signal cable: 7 mm
  Thickness of input signal cable: 0.5 to 1.5 mm² (for twisted cable)
WE7272: Isolated BNC

Sampling skew between channels in synchronous operation (with filter turned off):
  Channels in one module: Approx. 30 ns (Typical value (see Note 1))
  Channels in adjacent modules: 20 × (N – 1) + 50 ns
  (Typical value (see Note 1) + module skew), where N is the number of linked modules.

General Specifications

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

Warm-up time: At least 30 minutes

Maximum allowable input voltage: ±50 VDC + AC peak
  (Overvoltage Category: CAT I and II)

Maximum common mode voltage
  Between the L terminal and ground
  WE7271: 250 VACrms or ±250 VDC
  WE7272: ±42.4 VDC + AC peak

Maximum voltage across channels
  WE7271: ±250 VACrms or ±250 VDC (Between any two terminals of different channels)
  WE7272: ±42.4 VDC + AC peak (Between L terminals of different channels)

Withstanding voltage
  Between input terminal and ground: 60 Hz 1500 VACrms for one minute
  Between channels
    WE7271: 60 Hz 2300 VACrms for one minute
    WE7272: 60 Hz 1500 VACrms for one minute

Insulation resistance
  Between input terminal and ground and between channels: 500 VDC, 10 MΩ or higher

Operating conditions: Same as those of the measuring station

Storage conditions
  Temperature: –20°C to 60°C
  Humidity: 20 to 80% RH (no condensation)

Power consumption: 12 VA (Typical value (see Note 1) at 100 V/50 Hz)

External dimensions: Approx. 33{1.3} (W) × 242{9.54} (H) × 227{8.94} (D) mm{inch} (projections excluded)

Weight: Approx. 0.7{1.54} kg{lb}

Number of used slots: 1

Standard accessory
WE7271: Terminal block (1) (attached to the input connector at the time of shipment), User’s Manual (1)
WE7272: User’s Manual (1)

Note 1: Typical value represents a typical or average value.
  It is not strictly guaranteed.

Note 2: Ambient temperature: 23 ±5°C, Ambient humidity: 50 ±10% RH, after the warmup time has passed
WE7273
8-CH, 100 kS/s Isolated Digitizer Module

**Overview**

The WE7273 8-channel 100-kS/s isolated digitizer module can convert 8 channels’ worth of analog signals to digital signals at a maximum speed of 100 kHz. Equipped with eight A/D converters, each module can sample data through eight channels simultaneously at 100 kHz. The input channels are isolated from each other, as well as from the ground.

Each module contains in its flash memory the graphic data for screens used to set such data items as the range and sampling rate necessary for module operation. When connected to a personal computer, the module is actuated once it transfers the graphic data to the computer. In addition, two or more modules can be mounted side by side to enable synchronous operation. These modules support the trigger function that permits you to acquire data before and after the rise of a specific event.

**Features**

- 100-kS/s sampling and 16-bit analog-to-digital conversion on all eight channels simultaneously
- Isolation between inputs and between inputs and ground
- Built-in 8MWord acquisition memory
- Operates in sync with an adjacent WE7273 module
- Trigger function that allows data immediately before and after the rise of an event, to be acquired correctly

**Performance Specifications**

- Number of input channels: 8
- Input format: Floating unbalanced input, isolation between channels and between the input and ground
- Connector type: Clamp terminal (terminal block is detachable)
- Input coupling: DC/AC
- Measurement range: ±50 mV to ±50 V (1-2-5 steps)
- A/D resolution: 16 bits (includes the sign)
- Input impedance: Approx. 1 MΩ
- Maximum source resistance: 100 Ω or less
- Frequency characteristics (–1.5 dB attenuation point, during filter OFF):
  - During AC coupling: 10 Hz to 40 kHz (Typical value (see Note 1))
  - During DC coupling: DC to 40 kHz (Typical value (see Note 1))
- Input filter: OFF/5 kHz/500 Hz/50 Hz (–3 dB attenuation point) (Typical value (see Note 1))

**DC Accuracy (see Note 2)**

<table>
<thead>
<tr>
<th>Measurement Range</th>
<th>Accuracy</th>
<th>Temperature coefficient (at 5-18°C or 28-40°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>±50mV</td>
<td>±(0.15% of rdg + 0.5 mV)</td>
<td>±(30 ppm + 20 µV)/°C</td>
</tr>
<tr>
<td>±100 mV</td>
<td>±(0.15% of rdg + 0.5 mV)</td>
<td>±(30 ppm + 25 µV)/°C</td>
</tr>
<tr>
<td>±200 mV</td>
<td>±(0.15% of rdg + 0.5 mV)</td>
<td>±(30 ppm + 30 µV)/°C</td>
</tr>
<tr>
<td>±500 mV</td>
<td>±(0.05% of rdg + 0.5 mV)</td>
<td>±(25 ppm + 30 µV)/°C</td>
</tr>
<tr>
<td>±1 V</td>
<td>±(0.05% of rdg + 0.7 mV)</td>
<td>±(25 ppm + 30 µV)/°C</td>
</tr>
<tr>
<td>±2 V</td>
<td>±(0.05% of rdg + 1.4 mV)</td>
<td>±(25 ppm + 50 µV)/°C</td>
</tr>
<tr>
<td>±5 V</td>
<td>±(0.05% of rdg + 3.5 mV)</td>
<td>±(25 ppm + 0.1 mV)/°C</td>
</tr>
<tr>
<td>±10 V</td>
<td>±(0.05% of rdg + 7 mV)</td>
<td>±(45 ppm + 0.5 mV)/°C</td>
</tr>
<tr>
<td>±20 V</td>
<td>±(0.05% of rdg + 14 mV)</td>
<td>±(45 ppm + 0.7 mV)/°C</td>
</tr>
<tr>
<td>±50 V</td>
<td>±(0.05% of rdg + 35 mV)</td>
<td>±(45 ppm + 1 mV)/°C</td>
</tr>
</tbody>
</table>

Residual noise (With filter OFF and input terminals shorted): ±400 µV or ±0.04% of (upper limit of range – lower limit of range), whichever is greater (Typical value (see Note 1))

Common mode rejection ratio (With filter OFF at 50/60 Hz):
- ±50 mV to ±5 V range: 100 dB or higher (Typical value (see Note 1))
- ±10 V to ±50 V range: 80 dB or higher (Typical value (see Note 1))

Acquisition method: Trigger, free run, gate (level), gate (edge)

Memory length of acquisition memory: 8 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/CH (for 5 CH to 8 CH measurement)
- 2 MWords/CH (for 3 CH/4 CH measurement)
- 4 MWords/CH (for 2 CH measurement)
- 8 MWords/CH (for 1 CH measurement)
Time base source: Module’s internal clock, or the time base signal (CMNCLK) of the measuring station (WE bus) 

Maximum sampling rate: 100 kS/s 
Internal time base: 10 µs to 10 s (1 µs step) 
Trigger base accuracy: Same as the reference clock of the measuring station (±100 ppm for 707001/ 707002) 
Trigger source: Input signal (includes input signals of other isolated digitizer modules that are linked), or the bus trigger (BUSTRG1/ BUSTRG2) 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

<table>
<thead>
<tr>
<th>Measurement Range</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>±50mV</td>
<td>0.1 mV</td>
</tr>
<tr>
<td>±100 mV</td>
<td>1 mV</td>
</tr>
<tr>
<td>±200 mV</td>
<td>1 mV</td>
</tr>
<tr>
<td>±500 mV</td>
<td>1 mV</td>
</tr>
<tr>
<td>±1V</td>
<td>10 mV</td>
</tr>
<tr>
<td>±2 V</td>
<td>10 mV</td>
</tr>
<tr>
<td>±5 V</td>
<td>10 mV</td>
</tr>
<tr>
<td>±10 V</td>
<td>100 mV</td>
</tr>
<tr>
<td>±20 V</td>
<td>100 mV</td>
</tr>
<tr>
<td>±50 V</td>
<td>100 mV</td>
</tr>
</tbody>
</table>

Hysteresis width: 0.5% of (upper limit of range – lower limit of range) (Typical value (see Note 1))  
Measurement accuracy: 1% of ± (upper limit of range – lower limit of range) 

Trigger type: Edge trigger, state trigger, combination trigger (AND/OR of the input signals) 
Pre-trigger Amount (Selectable Only When Trigger Mode Is Selected)  
- Set in the range from 0 to (the record length – 2)  
Skew between Channels (within the same module): 50 ns (Typical value (see Note 1))  
Skew between Modules (when modules of the same type are linked): [20 × (N-1) + 50] ns + skew between channels within the same module (between the 1st and the Nth module when WE7273s are linked, typical value (see Note 1)) 

**Note 1:** Typical value represents a typical or average value. It is not strictly guaranteed. 

**Note 2:** Value measured at an ambient temperature of 23±5°C, ambient humidity of 50±10% RH, after the warm-up time has passed 

**AVAILABLE MODEL**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>707273/HE</td>
<td>8-CH, 100 kS/s Isolated Digitizer Module</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Model</th>
<th>Description</th>
<th>Order quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal block</td>
<td>B9953FE</td>
<td>18-point Terminal</td>
<td>1</td>
</tr>
</tbody>
</table>

**Dimensions**

WE7273

Unit: mm (inch)
WE7275
2-CH, 1 MS/s Isolated Digitizer Module

**Overview**

The WE7275 2-channel 1 MS/s isolated digitizer module can convert the analog signals of 2 channels to digital signals at a maximum speed of 1 MHz. Equipped with two A/D converters, the module can sample data through two channels simultaneously at 1 MHz. The input channels are isolated from each other, as well as from the ground. The module contains in its flash memory the graphic data for screens used to set such data items as the range and sampling rate necessary for module operation. When connected to a personal computer, the module is actuated once it transfers the graphic data to the computer. In addition, two or more modules can be mounted side by side to enable synchronous operation. The module supports the trigger function that permits you to acquire data before and after the rise of a specific event.

**Features**

- 1 MS/s sampling and 14-bit analog-to-digital conversion of both channels simultaneously
- Isolation between input channels and between input channels and ground
- Built-in 4MWord acquisition memory
- Operates in sync with an adjacent WE7275 module
- Trigger function that allows data immediately before and after the rise of an event, to be acquired correctly

**Performance Specifications**

Number of input channels: 2
Input format: Floating unbalanced input, isolation between channels and between the input and ground
Connector type: Isolated BNC
Input coupling: DC/AC
A/D resolution:
- ±100 mV range: Equivalent to 14 bits (includes the sign)
- ±500 mV range: Equivalent to 13 bits (includes the sign)

Input impedance: Approx. 1 MΩ
Maximum source resistance: 100 V or less
Frequency characteristics (–3 dB attenuation point, when filter is turned OFF):
- For DC coupling: DC to 500 kHz (Typical value (see Note))
- For AC coupling: 1 Hz to 500 kHz (Typical value (see Note))

Input filter:
- Low-pass filter
  - Cut-off frequency: OFF, 100 kHz, 40 kHz, 4 kHz, 400 Hz (Typical value (see Note))
  - Filter characteristics: 4th order Bessel characteristics (–24 dB/oct.)
- Anti-aliasing filter
  - Cut-off frequency: OFF, 20 Hz to 40 kHz (in steps of 1, 2, 4 and their ten-fold multiples)
  - Pass-band characteristics: ±1 dB at 5 to 100% of the cut-off frequency (Typical value (see Note))
  - Attenuation characteristics: –80 dB at frequencies greater than or equal to 2.1 times the cut-off frequency (Typical value (see Note))
  - Acquisition method: Trigger, free run, gate (level), gate (edge)

Memory length of acquisition memory:
- 2 MWord/CH (when using 2CH) or 4 MWord/CH (when using 1CH)

<table>
<thead>
<tr>
<th>Range</th>
<th>Accuracy</th>
<th>Temperature coefficient (at 5-18°C or 28-40°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>±100 mV</td>
<td>±0.15% of rdg + 0.4 mV</td>
<td>±(100 ppm of rdg + 30 µV)/°C</td>
</tr>
<tr>
<td>±200 mV</td>
<td>±0.15% of rdg + 0.6 mV</td>
<td>±(100 ppm of rdg + 60 µV)/°C</td>
</tr>
<tr>
<td>±500 mV</td>
<td>±0.15% of rdg + 1 mV</td>
<td>±(100 ppm of rdg + 30 µV)/°C</td>
</tr>
<tr>
<td>±1 V</td>
<td>±0.15% of rdg + 1.7 mV</td>
<td>±(100 ppm of rdg + 0.1 mV)/°C</td>
</tr>
<tr>
<td>±2 V</td>
<td>±0.15% of rdg + 3.2 mV</td>
<td>±(100 ppm of rdg + 0.2 mV)/°C</td>
</tr>
<tr>
<td>±5 V</td>
<td>±0.15% of rdg + 8 mV</td>
<td>±(100 ppm of rdg + 0.5 mV)/°C</td>
</tr>
<tr>
<td>±10 V</td>
<td>±0.15% of rdg + 40 mV</td>
<td>±(100 ppm of rdg + 3 mV)/°C</td>
</tr>
<tr>
<td>±20 V</td>
<td>±0.15% of rdg + 60 mV</td>
<td>±(100 ppm of rdg + 4 mV)/°C</td>
</tr>
<tr>
<td>±50 V</td>
<td>±0.15% of rdg + 100 mV</td>
<td>±(100 ppm of rdg + 6 mV)/°C</td>
</tr>
<tr>
<td>±100 V</td>
<td>±0.15% of rdg + 170 mV</td>
<td>±(100 ppm of rdg + 10 mV)/°C</td>
</tr>
<tr>
<td>±200 V</td>
<td>±0.15% of rdg + 320 mV</td>
<td>±(100 ppm of rdg + 20 mV)/°C</td>
</tr>
<tr>
<td>±350 V</td>
<td>±0.15% of rdg + 800 mV</td>
<td>±(100 ppm of rdg + 50 mV)/°C</td>
</tr>
</tbody>
</table>

Measurement range/Accuracy (Ambient temperature: 23 ±5°C, Ambient humidity: 50 ±10% RH, after the warm-up time has passed)
Memory partition (partition possible only when trigger mode is selected): Select from 1/2/4/8/16/32/64/128/256 partitions

Maximum sampling rate: 1.024 MS/s

Time base source: Module’s internal clock, external clock, or the time base signal (CMNCLK) of the measuring station (WE bus)

Internal time base: 1 µs to 1 s

Trigger source: Input signal (includes input signals of other isolated 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: 1 mV at ±100/200/500 mV range, 10 mV at ±1/2/5 V range, 0.1 V at ±10/20/50 V range, 1 V at ±100/200/350 V range
- Hysteresis width: 5% of (upper limit of range – lower limit of range) (Typical value (see Note))
- Setting Accuracy: 3% of ±(upper limit of range – lower limit of range)

Trigger type: Edge trigger, state trigger, combination trigger (AND/OR of the input signals)

Amount of pre-trigger (selectable only when trigger mode is selected): Set in the range from 0 to (the record length – 2)

External clock input:
- Input format: Non-isolated unbalanced (TTL)
- H level input: 2.2 V min.
- L level input: 0.5 V max.
- Input resistance: 10 kΩ (Typical value (see Note))
- Connector type: BNC

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

### General Specifications

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

Warm-up time: At least 30 minutes

Maximum allowable input voltage:
- Analog input signal: ±400 V (DC + ACpeak)
- External clock input: –1 V to +6 V (Overvoltage Category: CAT I and II)

Maximum common mode voltage (between the analog signal input L terminal and ground): ±250 VDC or 250 VACrms (when using the isolated BNC plug included in the package)

Maximum voltage across channels (between any two analog signal L terminals of different channels): ±250 VDC or 250 VACrms

Insulation withstand voltage:
- Between analog signal input L terminal and ground
- 1500 VAC (60 Hz) for one minute
- Between analog signal input channel L terminals
- 2300 VAC (60 Hz) for one minute

Insulation resistance (Between analog signal input L terminal and ground and between analog input channels):
- 500 VDC, 10 MΩ or more

Operational conditions: Same as those of the measuring station

Storage conditions:
- Temperature: –20 to 60°C
- Humidity: 20 to 80% RH (no condensation)
- Power consumption: 14 VA (typical value (see Note) at 100 V/50 Hz)

External dimensions: Approx. 33{1.3} (W) × 243{9.54} (H) × 232{9.13} (D) mm{inch} (projections excluded)

Weight: Approx. 0.8{1.76} kg{lb}

Number of used slots: 1

Standard accessories: Isolated BNC plugs (2), User’s Manual (1)

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

### AVAILABLE MODELS

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>707275/HE</td>
<td>2-CH, 1 MS/s Isolated Digitizer Module</td>
</tr>
</tbody>
</table>

### Dimensions

![Dimensions Diagram](image-url)
WE7281/WE7282
4-CH, 100 kS/s D/A Module

■ Overview
The WE7281/WE7282 4-channel 100-kS/s D/A module can convert 4 channels’ worth of digital signals to analog signals at maximum speed of 100 kHz. The output channels are isolated from each other, as well as from the ground. Not only arbitrary waveform generator, but function generator and DC output functions are available. Its flash memory contains setup information required for module operations. Setup information is transferred to the PC when the module is connected. In addition, two or three modules can be mounted side by side to enable synchronous operation.

■ Featured
• 100 kS/s sampling and 16-bit digital to analog conversion on all four channels simultaneously
• Isolation between outputs and between outputs and ground
• Three functional mode: Arbitrary waveform generator, function generator, DC output
• Arbitrary waveform generator:
  Waveform memory 4 MWord (at 1ch)
  Generate WE7251/WE7271 acquisition data and waveform Data edited by Yokogawa waveform editor
• Function generator
  Linear, log, Arbitrary sweep for frequency, amplitude, both Frequency and amplitude simultaneously, duty cycle (only for pulse wave)

■ Performance Specifications
Number of Output Channels: 4
Output format: Floating unbalanced output, isolated between channels
D/A resolution: 16 bits (includes the sign)
Output range: ±1 V, ±2 V, ±5 V, ±10 V
Maximum output current: ±10 mA (per channel)
Allowable load resistance: 1 kΩ or more
Output impedance: 1 Ω or less
During DC Output
DC accuracy
(at ambient temperature of 23 ± 5°C, ambient humidity of 50 ± 10% RH, after the warm-up time has passed)

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution DC Accuracy</th>
<th>Temperature Coefficient (5-18°C, 28-40°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>±1 V</td>
<td>±(0.05% of setting + 0.5 mV)</td>
<td>±(50 ppm of setting + 33 µV/°C)</td>
</tr>
<tr>
<td>±2 V</td>
<td>±(0.05% of setting + 1 mV)</td>
<td>±(50 ppm of setting + 54 µV/°C)</td>
</tr>
<tr>
<td>±5 V</td>
<td>±(0.05% of setting + 2 mV)</td>
<td>±(50 ppm of setting + 116 µV/°C)</td>
</tr>
<tr>
<td>±10 V</td>
<td>±(0.05% of setting + 4 mV)</td>
<td>±(50 ppm of setting + 220 µV/°C)</td>
</tr>
</tbody>
</table>

Setting time: 32 µs (until the value settles within ±0.1% of the final value, typical value (see Note))
Trigger source: Manual, bus trigger signal (BUSTRG1/ BUSTRG2) of the measuring station.

During Function Waveform (FG) Output
Output waveform: Sine, pulse (variable duty cycle), ramp, triangular, arbitrary, and DC.
Output frequency range and resolution: 1 mHz to 20 kHz (Sine wave), 1 mHz to 10 kHz (other waves)
Resolution: 1 mHz
Output frequency accuracy: ±(0.01% of setting + 23 µHz)
Maximum output voltage Range: within the output range
Amplitude range and accuracy: (at ambient temperature of 23 ± 5°C, ambient humidity of 50 ± 10% RH, after the warm-up time has passed.)

<table>
<thead>
<tr>
<th>Range Setting</th>
<th>Selectable range</th>
<th>Resolution (for 1-kHz sine wave)</th>
<th>Offset Voltage/DC output Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>±1 V</td>
<td>0 to 2 Vp-p</td>
<td>0.1 mVp-p</td>
<td>±2 mV</td>
</tr>
<tr>
<td>±2 V</td>
<td>0 to 4 Vp-p</td>
<td>1 mVp-p</td>
<td>±4 mV</td>
</tr>
<tr>
<td>±5 V</td>
<td>0 to 10 Vp-p</td>
<td>1 mVp-p</td>
<td>±10 mV</td>
</tr>
<tr>
<td>±10 V</td>
<td>0 to 20 Vp-p</td>
<td>1 mVp-p</td>
<td>±20 mV</td>
</tr>
</tbody>
</table>

Amplitude frequency characteristics (when generating maximum voltage at each range, with an offset voltage of 0 V, and measuring the rms value at 1 kHz as reference)

<table>
<thead>
<tr>
<th>Signal Type</th>
<th>Frequency</th>
<th>Amplitude</th>
<th>Offset Voltage/DC output Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sine</td>
<td>≤20 kHz</td>
<td>≤0.34 dB</td>
<td></td>
</tr>
<tr>
<td>Pulse</td>
<td>≤10 kHz</td>
<td>+0/-3.2%</td>
<td></td>
</tr>
<tr>
<td>Triangular</td>
<td>≤10 kHz</td>
<td>+0/-3%</td>
<td></td>
</tr>
<tr>
<td>Ramp</td>
<td>≤10 kHz</td>
<td>+0/-12.9%</td>
<td></td>
</tr>
</tbody>
</table>

Sine wave purity (when generating maximum voltage at each range, with an offset voltage of 0 V)
Harmonics (the maximum value in 2 to 5th order harmonics)

<table>
<thead>
<tr>
<th>Harmonic</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 kHz</td>
<td>≤55 dBc or less</td>
</tr>
<tr>
<td>10 kHz</td>
<td>≤50 dBc or less</td>
</tr>
</tbody>
</table>
Surplus (frequency range of 1 kHz to 100 kHz)
1 kHz: –55 dBc or less
10 kHz: –50 dBc or less

Pulse wave characteristics (when generating maximum
voltage at each range, with an offset voltage of
0 V)
Rise time: 1.2 μs (10% to 90%, typical value (see
Note))
Overshoot: Less than or equal to ±0.5% of the output p-
p value (typical value (see Note))
Output jitter: ±5 μs
Duty cycle setting
Range: 0 to 100% (resolution 0.1%) Time accuracy: ±((0.01% of 1/the output frequency) +
5 μs)
Phase
Target: Start and stop phase of trigger oscillation,
gate oscillation, and continuous oscillation
Range: ±360° (Resolution: 0.1°)

Overshoot: Less than or equal to ±0.5% of the output p-
p value (typical value (see Note))
Output jitter: ±5 μs
Duty cycle setting
Range: 0 to 100% (resolution 0.1%)
Time accuracy: ±((0.01% of 1/the output frequency) +
5 μs)

Phase
Target: Start and stop phase of trigger oscillation,
gate oscillation, and continuous oscillation
Range: ±360° (Resolution: 0.1°)
Output operation: Continuous, trigger, and gate
Trigger source: Manual, bus trigger signal (BUSTRG1/
BUSTRG2) of the measuring station.
Gate source: Manual, bus trigger signal (BUSTRG1/
BUSTRG2) of the measuring station.

Sweep function: Frequency, amplitude, both frequency
and amplitude simultaneously, duty cycle (only for
pulse wave)
Sweep mode: Linear, log, and arbitrary pattern
Sweep time: 1 s to 1000 s
Sweep time resolution: 1 ms
Sweep time accuracy: ±(0.033% of setting)
Bus trigger output: Output at an arbitrary phase angle of
the specified channel.
Bus trigger output time accuracy: ±12.5 μs

During Arbitrary Waveform (AG) Output
Maximum D/A sampling interval: 10 μs
Sampling clock source: Internal, or the time base signal
(CMNCLK) of the measuring station
Internal clock interval: 10 μs to 10 s
Internal clock interval resolution 10 μs
Memory length: 1 MWord/CH (at 4 CH), 2 MWord/CH (at
2 CH), or 4 MWord/CH (at 1 CH)
Memory partitions: 1, 2, 4, 8, 16, 32, 64, 128, or 256
Waveform pattern length: 10 to (memory length/the
number of memory partitions)
Waveform output mode: Single, continuous, single by
triggering, and continuous by triggering
Trigger source: Manual, bus trigger signal (BUSTRG1/
BUSTRG2) of the measuring station.
Bus trigger output: Output at an arbitrary sample of
the specified channel.
Bus trigger output time accuracy: ±(sampling interval + 7.5 μs)

Synchronized Operation
Skew between channels Within the same module: 1.5 μs
(typical value (see Note)) Between adjacent
modules: 1.6 μs (typical value (see Note))

General Specifications
Safety standard: Complies with CSA C22.2 No. 1010.1
and EN61010-1, conforms to JIS C1010-1
Warm-up time: At least 30 minutes
Maximum Common-Mode Voltage (between L Terminal
and Ground)
WE7281: ±250 VDC or 250 VACrms
WE7282: ±42.4 VDC + ACpeak
Maximum Voltage between Channels
WE7281: ±250 VDC or 250 VACrms
WE7282: ±42.4 VDC + ACpeak
Withstand Voltage
Between output terminal and ground
WE7281/WE7282: 1500 VACrms at 60 Hz for one
minute
Between channels
WE7281: 2300 VACrms at 60 Hz for one minute
WE7282: 1500 VACrms at 60 Hz for one minute
Insulation Resistance (between Output Terminal and
Ground and between Channels)
10 MΩ or more at 500 VDC

Output Connector
WE7281: Clamp type terminal (terminal block is
detachable)
WE7282: Isolated BNC

Operating conditions: Same as those of the measuring
station
Storage conditions
Storage temperature range: –20 to 60°C
Storage humidity range: 20 to 80% RH (no condensa-
tion)
Power consumption: 15VA (typical value (see Note) at
100 V/50 Hz.)
External dimensions: Approx. 33{1.30} (W) × 243{9.57}
(H) × 232{9.13} (D) mm{inch} (projections excluded)
Weight: Approx. 0.9{1.98} kg{lb}
Number of dedicated slots: 1

Standard Accessories
WE7281: Terminal block (1) (attached to the output
connector at the time of shipment)
User’s Manual (1)
WE7282: User’s Manual (1)

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

AVAILABLE MODELS

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>707281/HE</td>
<td>4-CH, 100 kS/s D/A Module</td>
</tr>
<tr>
<td>707282/HE</td>
<td>4-CH, 100 kS/s D/A Module</td>
</tr>
</tbody>
</table>

Special Accessories (sold separately)

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Model</th>
<th>Description</th>
<th>Order quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal block</td>
<td>A1460JT</td>
<td>16PT Terminal</td>
<td>1</td>
</tr>
</tbody>
</table>
■ Dimensions

WE7281:

WE7282:
WE7311
1 GS/s Digital Oscilloscope Module

■ Overview
This module contains a digital oscilloscope and digitizer with a range of basic functions. Its flash memory contains setup information required for module operations, such as ranges, time axes, and triggers. The setup information is transferred to the PC when the module is connected.

■ Features
- 1 GS/s, A/D 8-bit resolution
- 400 MHz analog bandwidth (real time samples only)
- 2MWord memory
- Sequential store
- Synchronized operations between adjacent WE7311 modules

■ Standard Specifications
- Measurement input section
  Number of Input Channels: 1
  Input Coupling: DC (1 M/50 Ω), AC (1 M/50 Ω), GND
  Input Impedance: 1 Ω ± 1% (approx. 10 pF) or 50 Ω ± 1%
  Input Voltage Range: During oscilloscope mode: 5 mV/div to 500 mV/div (in 1-2-5 steps) During digitizer mode: ±25 mV to ±2.5 V range (in 1-2.5-5 steps)
  Vertical Resolution: 8 bits
  Maximum Input Voltage: When the input impedance is 1 MΩ ± 42 V (DC + peak AC < 10 kHz) When the input impedance is 50 Ω ± ± VDC (500 mW) or 5 Vrms (see Note 1) Overvoltage Category CAT I and II
  Frequency Characteristics (see Note 2) (see Note 3): For 10 mV/div to 500 mV/div or ±50 mV to ±25 V range: DC to 400 MHz. For 5 mV/div or ±25 mV range: DC to 250 MHz –3dB point in the low frequency region during AC coupling: 10 Hz or less
  Voltage Axis DC Accuracy (see Note 2): ±(2% of input voltage range (full scale) + offset voltage accuracy)
  DC Offset Setting Range:
  For 5 mV/div to 50 mV/div or ±25 mV to ±250 mV range: ±0.7 V (1 mV resolution).
  For 100 mV/div to 500 mV/div or ±500 mV to ±2.5 V range: ±10 V (1 mV resolution)
  Offset Voltage Accuracy (see Note 2):
  For 5 mV/div to 50 mV/div or ±25 mV to ±250 mV range: ±0.1% of the specified value 
  For 100 mV/div to 500 mV/div or ±500 mV to ±2.5 V range: ±0.1% of the specified value 
- Significant Bits
  >6.5 bits (DC-50 MHz) (typical value (see Note 4))
  >6.0 bits (50 MHz-100 MHz) (typical value (see Note 4))
- Skew between Modules (see Note 5): Within 1 sampling interval (typical value (see Note 4))
- Isolation between Channels (see Note 5): –40 dB@100 MHz (typical value (see Note 4) in the same range)

- Trigger Mode
  NORMAL: Acquire the waveform only when a trigger occurs.
  AUTO: Automatically acquire the waveform if the trigger does not occur for a prescribed time period.
  Trigger Source: Input signal (includes input signal from linked WE7311 modules), external input (EXT IN), and bus trigger (BUSTRG1/BUSTRG2) signal of the WE bus
  Trigger Coupling: DC, LF Rejection (approx. 50 kHz)
  Trigger Type: Edge
  Trigger Slope: Rising edge or falling edge
  Trigger Level Setting Range: Within the input voltage range (when using DC coupling, 0.5% resolution)
  Residual Noise Level:
  For 5 mV/div to 50 mV/div or ±25 mV to ±250 mV range: ±2.0 mV or ±2 LSB, whichever is larger (typical value (see Note 4))
  For 100 mV/div to 500 mV/div or ±500 mV to ±2.5 V range: ±20 mV or ±2 LSB, whichever is larger (typical value (see Note 4))
Trigger Sensitivity:
DC to 1 MHz: 10% of the input voltage range (full scale)
DC to 300 MHz: 20% of the input voltage range (full scale)
DC to 400 MHz: 70% of the input voltage range (full scale)

Trigger Level Accuracy (see Note 1)
±5% of the input voltage range (full scale)

Trigger Position (During the Oscilloscope Mode):
±5 div

Pretrigger (During the Digitizer Mode): 0 to 100% of the acquisition sample

Trigger Delay: During the oscilloscope mode: 0 up to 300 s
During the digitizer mode: 0 to 200 M samples (however, the maximum value is the value corresponding to 300 s when converted into delay time)

Trigger Output: Able to output the acquisition trigger to the trigger bus (BUSTRG1/BUSTRG2) of the WE bus.

Output Trigger Input Impedance (see Note 2): 1 MΩ or 50 Ω

External Trigger Input Frequency Bandwidth (see Note 2): DC to 400 MHz (minimum voltage: 3 Vp-p)

External Trigger Input Voltage Range (see Note 2): ±4 V

External Trigger Level Setting Range: ±4 V (0.1 V resolution)

The external trigger input and external clock input share the same connector.

**Time Axis**

Time Axis Setting Range (During Oscilloscope Mode)
10 ns/div to 50 s/div (in 1-2-5 steps)

Sampling Interval (During the Digitizer Mode)
1 ns to 10 ms (in 1-2-5 steps) (For API, 1-2-2.5-4-5 steps)

Time Axis Accuracy (see Note 1): ±(25 ppm + 1 sampling interval)

External Clock Input/Output (see Note 2): Able to input an external input signal (EXT IN) as a sampling clock. Able to input an external input signal (EXT IN) or the time base (CMNCLK) signal of the WE bus as a reference clock. Able to output the 10-MHz internal reference clock to the time base (CMNCLK) of the WE bus.

External Clock Input Impedance: 1 MΩ or 50 Ω

External Clock Input Voltage Range: ±4 V

External Clock Input Threshold: ±2 V (0.1 V resolution)

External Sampling Clock Input: Frequency Range /
Minimum Voltage: 10 MHz to 500 MHz/3 Vp-p

External Reference Clock Input Frequency Range/
Minimum Voltage: 10 MHz/800 mVp-p

**Special Accessories** (sold separately)

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Model</th>
<th>Description</th>
<th>Order quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module link connector</td>
<td>B9952RB</td>
<td>700944 10 : 1 10 MΩ 300 MHz Bandwidth</td>
<td>1</td>
</tr>
</tbody>
</table>

**Dimensions**

<table>
<thead>
<tr>
<th>Unit: mm (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>227 (8.94)</td>
</tr>
<tr>
<td>203 (8.0)</td>
</tr>
<tr>
<td>33 (1.3)</td>
</tr>
</tbody>
</table>

**Note 1:** When overvoltage is applied, the protective circuit is activated, and the input coupling is switched to GND.

**Note 2:** Value measured with the time base set to internal clock under standard operating conditions after warm-up time has elapsed and after calibration.

**Note 3:** The –3 dB point when the input coupling is set to DC 50 Ω with a 100-kHz sine wave with an amplitude corresponding to ±3 divisions used as a reference.

**Note 4:** Typical value represents a typical or average value. It is not strictly guaranteed.

**Note 5:** Measured using the same range with the time base set to internal clock under linked operation.
**WE7521**  
4-CH Timing Measurement Module

---

### Overview
The WE7521 is a 4-channel counter module.

It can measure one of five parameters (period, time interval, totalize count, up and down count, and frequency ratio) of four input signals.

The measured values are written to the acquisition memory every specified sampling interval.

In addition, the WE7521 includes a “time stamp mode” in which the time is recorded when any of the four input signals change.

### Features
- Arbitrarily combine 4 channels of input, and perform measurement on one of five parameters (period, time interval, totalize count, up and down count, and frequency ratio)
- Store up to 1 Mpoints of measured data continuously (up to 4 Mpoints in time stamp mode)
- 5 ns time resolution, maximum sampling frequency of 500 kSps (in counter mode)

### Performance Specifications

**Number of Inputs:** 4  
**Input Format:** Non-isolated, unbalanced  
**Connector Type:** BNC  
**Input Coupling:** DC/AC  
−3 dB Point During AC Coupling: 10 Hz (Typical value (see Note 1))  
**Input Threshold Level:** Set in the range ±20 V (0.1 V resolution) for each input  
**Threshold Level Accuracy:** ±(5% of the specified value + 150 mV)  
**Input Impedance:** 1 MΩ ±1%  
**Input Filter:** OFF/100kHz/10kHz/1kHz (−3 dB point) (Typical value (see Note 1))  
**Input Sensitivity:** When hysteresis width is NORMAL and frequency is 1 MHz or less: 1.0 Vpp (Typical value (see Note 1))  
When hysteresis width is WIDE and frequency is 1 MHz or less: 3.0 Vpp (Typical value (see Note 1))  
**Hysteresis Width:** NORMAL/WIDE  
**Hysteresis Direction:** Center/Upper/Lower (common to all inputs)  
**Maximum Input Voltage:** ±42.4 V (DC + ACpeak) (Overvoltage Category CAT I and II)

### Specifications for the Counter Mode
- **Number of Counters:** 4  
- **Measurement Slope:** Rising edge or falling edge  
- **Measurement Function:** Period, time interval, totalize count, up and down count, and frequency ratio  
- **Display Resolution:** During period/time interval measurement: 5 ns  
- Minimum Input Pulse Width: 50 ns  
- Minimum Input Edge Interval: For all input edges during up and down count: 50 ns  
- **Data Width:** During period/time interval measurement: 32 bits  
- During totalize count/up and down count/frequency ratio measurement: 29 bits (see Note 2)  
- **Acquisition Mode:** Trigger, free run, gate (level), gate (edge)  

### Specifications for Each Measurement Function

**a) Period**  
- Measurement range: 100 ns to 20 s (see Note 3)  
- Resolution: (5 ns ± trigger error)  
- Accuracy: Resolution ±(time base aging 3 sampling interval) ±5 ns

**b) Time interval**  
- Measurement range: 100 ns to 20 s (see Note 3)  
- Resolution: (±5 ns ± input A trigger error ± input B trigger error)  
- Accuracy: Resolution ±(time base aging 3 sampling interval) ± trigger level timing error ±5 ns

**c) Totalize count**  
- Counting capacity: 0 to 536,870,911 (see Note 3)  
- Counting control: Through measurement start/stop or gate (pulse) using the input signal  
- Counting error: ±1 count (when the counter is controlled through measurement start/stop)  
- ±1 count (input B trigger error [rising] input B trigger error [falling])  
- input A period  
(When controlled using gate/input A: signal to be measured, input B: gate signal)

**d) Up and down count**  
- Counting capacity: −268,435,456 to 268,435,455 (see Note 4)  
- Counting control: Through measurement start/stop or reset (Z phase) using the input signal  
- Counting error: ±1 count (when the counter is controlled through measurement start/stop)
±1 count ± (input B trigger error × N)

\[
\frac{\text{input A period}}{\text{input A period} \times N} \quad (N=1, 2, 4)
\]

(When controlled using reset/input A: signal to be measured, input B: reset signal)

Multiplication: \( \times 1, \times 2, \text{and} \times 4 \)

e) Frequency ratio

Counting capacity: 0 to 536,870,911 when multiplying factor is 1, 0 to 33,554,431.9 when multiplying factor is 16, 0 to 4,194,303.99 when multiplying factor is 128, 0 to 524,287,999 when multiplying factor is 1024 (see Note 3)

Counting control: Measurement start/stop

Counting error: ±1 count ± \( \left(\frac{\text{input B trigger error}}{\text{input A period} \times N} \right) \quad (N=1, 16, 128, 1024) \)

Multiplication: 1, 16, 128, and 1024

Acquisition Memory

Maximum record length: 1 Mpoint/CH

Memory partition: 1, 2, 4, 8, 16, 32, 64, 128, and 256

(only during trigger mode)

Sampling interval: 2µs to 10s

Sampling signal source: Internal time base, bus clock, and input signal

Trigger source: Input signal, measured value, bus trigger signal of the measuring station

Hold off: Record length to 1,048,576 points (trigger mode), 1 to 1,048,576 points (gate (edge) mode)

Data hold function: Hold previous value or Update on new value (see Note 5)

Specifications for the Time Stamp Mode

Number of Inputs: 4

Measurement Slope: Rising edge, falling edge, and both

Maximum Measurement Time: Approximately 360 hours (5 × 248 ns)

Display Resolution: 5 ns

Resolution: \( \pm 0.5 \text{ ns} \times \text{trigger error} \)

Accuracy: Resolution ± (time base aging × sampling interval) ±5 ns

Minimum Pulse Width: 200 ns

Data Format: 32 bits (24-bit time stamp data + 8-bit input edge data)

Acquisition Mode: Free run only (see Note 6)

Record Length: 4 Mpoints

Reference Time Axis Accuracy

Frequency Stability

Aging: \( \pm 1.5 \times 10^{-5} / \text{year} \)

Temperature Characteristics

\( \pm 2.0 \times 10^{-4} (5^\circ \text{C} \text{ to } 40^\circ \text{C}) \)

Note 1: Typical value represents a typical or average value. It is not strictly guaranteed.

Note 2: The measured data length is 29 bits, but the data width is expanded to 32 bits.

Note 3: When the measurement range is exceeded, the data is set to invalid value.

Note 4: When the measurement range is exceeded, the data returns to the minimum (maximum) value of the counting capacity and continues the measurement.

Note 5: You can select a mode in which the previous value is held or a mode in which an invalid value is held when there is no input change during the sampling interval.

Note 6: If the rate of change of input is too fast and the data cannot be saved, the measurement is stopped.
707821
Input Terminal Block

■ Overview
The 707821 input terminal block is used for signal input in combination with the WE7241 digital thermometer module or the WE7251 digitizer module. It can be used to measure temperatures and voltages when combined with the WE7241 digital thermometer module.

■ Features
• 10-channel input
• Independent H, L and G on each channel

■ Specifications
• Number of input channels: 10 (independent H, L and G on each channel)
• Input type: Each input channel is floating (see Note).
• Temperature measurement element: Platinum temperature measuring resistor, 100 Ω, Class A
• Standard operating conditions
  Temperature: –10 to 60°C
  Humidity: 20 to 80% RH
  (maximum wet-bulb temperature of 29°C; no condensation)
• Storage conditions
  Temperature: –20 to 60°C
  Humidity: 20 to 80% RH
• Maximum allowable input voltage (see Note): 30 VACrms, 42.4 Vpeak or ±60 VDC (Overvoltage categories: CAT I and CAT II)
• Maximum interchannel voltage (see Note): 60 VACrms or ±100 VDC
• Maximum allowable input current (see Note): 0.3 A
• Insulating withstand voltage
  Between input terminals and between input terminal and ground: 60 Hz, 1500 VACrms for one minute
• Insulating resistance (see Note):
  Between input terminals and between input terminal and ground: 500 VDC, 10 MΩ or greater
• Connectable cable diameter: 0.14{0.01} to 1.38{0.05} mm{inch}
• Recommended line length: 6{0.23} mm{inch}
• Connectable modules:
  707241 (10-channel digital thermometer module)
  707251 (10-channel 100 kS/s digitizer module)
• External dimensions: Approx. 29{1.14} (W) × 134.2{5.28} (H) × 103{4.06} (D) mm{inch} (projections excluded)
• Weight: Approx. 0.22{0.48} kg{lb}

Note: These specifications are for the input terminal block by itself. In practice, the specifications of the connected measurement module will be followed.
707823
16-Bit Digital Input Terminal Box

**Overview**
The 707823 16-bit digital input terminal box is used in combination with a WE7262 32-bit digital I/O module. It converts an external contact signal, as well as a voltage signal ranging up to ±35 V, into a TTL signal to feed it to the WE7262 module.

A maximum of two 707823 digital input terminal boxes can be connected to each WE7262 module, where each box is powered by the module via cable.

**Features**
- Couples a 16-bit contact signal or voltage signal with the WE7262 module.
- Compatible with voltage signals ranging up to ±35 V.
- Allows the input threshold level to be selected from 2 and 6 V by wiring.
- Isolation among binary-digit inputs and between each input terminal and the WE7262 module.

**Specifications**
- Number of input points: 16 (16 bits)
- Input voltage
  - H level: +2.5 V to +35 V (between H1 and L), or +8 V to +35 V (between H2 and L)
  - L level: −35 V to +1 V (between H1 and L), or −35 V to +5 V (between H2 and L)
- Input current
  - H level: +1 mA to +8 mA
  - L level: 10 μA or below
- Response time: 100 μs (Typical value (see Note))
- Input format: Each bit is isolated from casing, WE7262 module, and each other.

**General Specifications**
- Safety standard: Complies with CSA C22.2 No. 1010.1 and EN61010-1, conforms to JIS C1010-1
- Maximum allowable input voltage
  - Between H1 and L, or H2 and L: (35 VDC + AC peak) (Overvoltage Category: CAT I and II. Pollution degree: 1 and 2)
- Maximum common mode voltage
  - Between input terminal and WE7262: ±250 VDC or 250 VACrms
  - Between input terminal and casing: ±250 VDC or 250 VACrms
  - Between input terminals: ±250 VDC or 250 VACrms
- Withstanding voltage
  - Between input terminal and WE7262: 2300 VACrms for one minute
  - Between input terminal and casing: 2300 VACrms for one minute
  - Between input terminals: 2300 VACrms for one minute

**Operating conditions**
- Temperature: 5°C to 40°C
- Humidity: 20 to 80% RH (no condensation)

**Storage conditions**
- Temperature: −20°C to 60°C
- Humidity: 20 to 80% RH

**Connectable module:**
- WE7262 (Model: 707262) 32-bit digital I/O module
- Maximum power consumption: 0.1 W
- External dimensions: Approx. 97{3.8} (W) × 42{1.7} (H) × 234{9.2} (D) mm{inch} (projections excluded)

**Weight**
- Main unit: Approx. 0.5{1.1} kg{lb}
- Cable: Approx. 0.3{0.66} kg{lb}

**Standard accessory:**
- Shielded cable (1) (for connection between 707823 and 707262, 2 m), User’s Manual (1)

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

### AVAILABLE MODEL

<table>
<thead>
<tr>
<th>Description</th>
<th>Model</th>
<th>Specifications</th>
<th>Order quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-bit Digital Input Box</td>
<td>707823</td>
<td>For WE7262 contact input</td>
<td>1</td>
</tr>
</tbody>
</table>
## Dimensions

Unit: mm (inch)

- 96.6 (3.8)
- 2.7 (0.11)
- 233.6 (9.2)

## I/O Circuit Diagram

```
+5 V     +5 V
H1        H2
IO00-IO15
L
```

*Signal name*
# 707824
16-Bit Digital Output Terminal Box

## Overview

The 707824 16-bit digital output terminal box is used in combination with the WE7262 32-bit digital I/O module. It converts the CMOS-level output of the WE7262 module to contact signals to feed them to external equipment. A maximum of two 707824 digital output terminal boxes can be connected to each WE7262 module, where each box is powered by the module via cable.

## Features

- 16-bit MOS-level contact output
- 35-V/0.3-A output capacity
- Isolation among binary-digit outputs and between each output terminal and the WE7262 module

## Performance Specifications

- Number of output points: 16 (16 bits)
- Maximum applicable voltage (with the power turned off): ±35 V
- Maximum output contact current: ±300 mA
- Turn-on resistance: 4 Ω or below
- Leakage current (with the power turned off): 100 μA or below
- Response time: 3 ms (Typical value (see Note))
- Output format: MOS-level contact output
- Each bit is isolated from casing, WE7262 module, and each other.

## General Specifications

- Safety standard: Complies with CSA C22.2 No. 1010.1 and EN61010-1, conforms to JIS C1010-1
- Maximum common mode voltage:
  - Between input terminal and WE7262: ±250 VDC or 250 VACrms
  - Between input terminal and casing: ±250 VDC or 250 VACrms
  - Between input terminals: ±250 VDC or 250 VACrms
- Withstanding voltage:
  - Between input terminal and WE7262: 2300 VACrms for one minute
  - Between input terminal and casing: 2300 VACrms for one minute
  - Between input terminals: 2300 VACrms for one minute
- Operating conditions:
  - Temperature: 5°C to 40°C
  - Humidity: 20 to 80% RH (no condensation)
- Storage conditions:
  - Temperature: -20°C to 60°C
  - Humidity: 20 to 80% RH
- Protection: Protection against overvoltage (each output is protected with a fuse)

## AVAILABLE MODEL

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Note: Typical value represents a typical or average value. It is not strictly guaranteed.
Dimensions

Unit: mm (inch)

I/O Circuit Diagram

Fuse 0.5 A

IO00-IO15 (Signal name)
7078 31/7078 32/7078 33/7078 34
Optical Fiber Cables

■ Overview
These optical fiber cables are connected with the optical interface modules and optical interface cards.

■ Features
• These multi-mode optical fiber cables have dual SC connectors for easy setup.

■ Specifications
• Cable lengths:
  7078 31: 2 meters (6.56 ft)
  7078 32: 5 meters (16.4 ft)
  7078 33: 10 meters (32.8 ft)
  7078 34: 1 meter (3.28 ft)
• Fiber optic core diameter: 62.5 (50) µm
• Clad diameter: 125 µm
• Core noncircularity: Maximum 6%
• Clad noncircularity: Maximum 2%
• Core/clad eccentricity: Maximum 6%
• Numerical aperture (NA): 0.275 ±0.03
• Buffer layer: Silicon resin
• Coating: Polyamide resin (external diameter: 0.9 ±0.1)
• Protective coating: 1.2 core fiber optic cord (consisting of a fiber-optic core covered with a PVC jacket)
• Jacket material: PVC (light green), 2.8(0.11) × 5.6(0.22) mm[inch]
• Weight: Approx. 14 kg/km
• Minimum bending radius
  When extended: 60(2.36) mm[inch] (short-radius direction only)
  When fixed: 30(1.18) mm[inch] (short-radius direction only)
• Allowable instantaneous tensile stress: 196N

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