Main Specifications (Main Unit)

*1 Under standard operating conditions (temperature of 23°C ±5°C, 55% ±10% RH, warm-up of 30 min. or more), after calibration. Recommended calibration period: 1 year.
*2–*11 See the figure on page 11 for notes on the maximum input voltage and maximum allowable common mode voltage.

Basic specifications

- Input section
  - Type: Plug-in module (A/D converters built in to each unit)
  - Number of slots: 8
  - Logic input: 16 (8 bits × 2)
- Horizontal
  - Maximum record length: 2.5 MW/CH, 50 MW total
  - Time axis accuracy *1: ±0.005%
  - Time axis setting: 100 µsec to 5 sec (in steps of 1, 2, or 5)
    10 sec to 60 min (in steps of 1-2-3-5-6)
    100 min/120 min/300 min
    10 h/20 h/30 h/50 h/100 h/120 h
    10 days/20 days/30 days
- Acquisition modes
  - Normal: Maximum sample rate of 10 MS/s
  - Envelope: Holds the peak value at each module's maximum sample rate
  - Box average: Increases the A/D resolution by up to 4 bits (to 16 bits)
  - Averaging: Number of averagings 2 to 65536 (2^n steps)
  - Roll: Roll display for recording time of 1 sec or more
- Triggers
  - Modes: AUTO, AUTO LEVEL, NORMAL, SINGLE, SINGLE(n)
  - Trigger position: 0 to 100% (in steps of 0.1%)
  - Simple triggers Source: CH1 to CH16, LINE, EXT, LOGIC_A, LOGIC_B, Time
  - Slope selection: CH1 to CH16: Rise, fall, rise/fall
    EXT (external trigger input), LOGIC_A, LOGIC_B: Rise/fall
    Time: Date (year/month/date), hour (hours/minutes), time interval (1 min to 24 hours)
  - Enhanced triggers Source: CH1 to CH16, LOGIC_A, LOGIC_B (each logic bit can be combined with AND or OR logic)
  - Enhanced triggers Type: A→B(n), A delay B, B > Time, B < Time, B Time Out, Period, Window, Wave Window
  - ■ Wave Window mode restriction: ACQ mode: NORMAL; Trig mode: Normal, Single, Single(N); Sample rate: 500 kHz to 10 kHz
    Not available in roll mode or envelope.
    Modules that can use the Wave Window trigger are the 701250/51/55/60/61/62 (in their respective voltage modes).
- Screen updating rate: Max 30 times/sec for a single waveform

Display

- Display: 10.4-inch color TFT liquid crystal display
- Effective screen size: 211.1 mm × 158.4 mm
- Resolution: 800 × 600 *1
- Waveform display pixels: 650 × 512 (normal waveform display)
  750 × 512 (in wide waveform display mode)
- Display modes Split: Single, dual, triad, quad, octal, or hectal
- Zoom: Main, Main&Z1, Main&Z1&Z2, Main&Z2, Z1ONLY, Z2 ONLY, Z1&Z2
  (Z1 and Z2 are abbreviations for zoom area 1 and 2, respectively)
- XY: Single Mode (X is fixed, Y is set by user), Quad Mode (XY1, XY2, XY3, XY4)
- Accumulation: PERSIST Overlays in 1 color

■ The LCD may contain some pixels that are always ON or always OFF.
In addition, variations in brightness may occur due to the characteristics of liquid crystal display. This does not indicate any problem with the display.

Printer

- Built-in printer
  - Printing method: Thermal line-dot
  - Paper: A4 size (210 mm wide × 20 m)
  - Effective recording width: 200 mm = 1600 dots
  - Functions: Real time printing, XY printing, screen copying
  - High resolution printing of specified range: Zoom Print, Fine Print (print specified range in high resolution)
  - Maximum printing speed: 20 mm/s (500 ms/div)
- Real time printing (chart recorder mode)
  - Functions: Print/record waveforms in real time and automatically save to memory in the background (up to 1000 div)
  - Resolution Vertical: 8 dots/mm A4 size (200 mm) = 1600 dots
  - Horizontal: 10 dots/mm A4 size (300 mm) = 3000 dots
  - Waveform printing Speeds: 20 mm/s (500 ms/div), 10 mm/s, 5 mm/s, 2 mm/s, 1 mm/s, 100 mm/min, 50 mm/min, 25 mm/min, 20 mm/min, 10 mm/min, 5 mm/min, 2 mm/min, 1 mm/min, 100 mm/h, 50 mm/h, 25 mm/h, 20 mm/h, 10 mm/h
  - Print length (shot length): Continuous, 20 cm, 50 cm, 1 m, 2 m
  - Memory length: 2.5 MW/CH fixed, 1000 div (depending on the chart speed)
  - Numerical printing Digital values: Interval: 1 s, 2 s, 5 s, 10 s, 15 s, 20 s, 30 s, 1 min, 2 min, 5 min, 10 min, 15 min, 20 min, 30 min, 60 min
    Print directions: standard or rotated 180°C
  - Print format Vertical axis divisions: Select 1, 2, 3, 4, 8, or 16
    Flexible zone function available when one division selected
  - Vertical axis format: Select 1 division = 10 div printed or 1 div = 10 mm printed
  - Extra information: Gauge display, upper/lower limits, channel markers, time
  - Annotations: CH information, messages, CH data
  - Reprint function: Reprints after STOP (enables resetting of format and range specification)
    PDF file output function
  - Print start/stop: Starts printing on triggers (Single mode, Repeat (Normal) mode): Specified length printed upon triggers.
  - External terminal: Start/stop input terminal (L = start, H = stop)
- XY recorder mode
  - Functions Prints XY plots in high resolution: Emulates an XY plotter
  - Resolution Vertical: 8 dots/mm × 200 mm = 1600 dots
  - Horizontal: 8 dots/mm × 200 mm = 1600 dots
  - Max number of recordable waveforms: 4 (any group of 4)
  - Sample rate: 5 kS/s max
  - Memory length: 1 MW/CH
  - Record format: XY single (fixed)
- Zoom Print/Fine Print function
  - Functions: Enables high resolution printing of waveforms, also when not in real time mode
  - Zoom print: Quickly prints the portion zoomed with the GigaZoom engine in high resolution
  - Fine print: Prints the range specified by cursors in high resolution
  - Print format Vertical: Same format as in real-time mode
  - Horizontal: Print length can be specified

Analysis functions

- Ch-to-ch calculation function
  - Definable MATH waveforms: 8
  - Calculable record length: Up to 800 kWord (MATH1 only)
    Up to 100 kWord (MATH 1–8)
  - Operators: Addition, subtraction, multiplication, division, binary conversion, phase shifting, FFT
  - FFT type: PS
  - Points: 1000, 2000, 10000
  - Window functions: Rectangular, Hanning, Flattop

Waveform measurement functions

- Cursors
  - Types Horizontal (H): Two cursors
  - Vertical (V): Two horizontal axis cursors
  - Marker: Two vertical axis cursors
  - Degree: Cursor measured on the horizontal axis is displayed in a degree (T-Y display only)
  - H & V: For X-Y display only
- Automatic computation of waveform parameters
  - Maximum number of measured parameters: 24
  - Measured parameters: P-P, Max, Min, High, Low, Avg, Rms, Amp, StdDiv, +Oshot, -Oshot,
    Rise, Fall, Freq, Period, +Duty, +Width, -Width, Pulse, Burst1, Burst2, Avg Freq, Avg, Period, Rdelay, Fdelay, Int1TY, Int2TY, Int1XY, Int2XY
- Cycle statistical process
  - Maximum number of cycles: 48,000 (for one parameter)
  - Maximum total number of parameters: 48,000 (total measured results)
  - Statistical values: Maximum, minimum, average, standard deviation, number of samples
  - Maximum measuring range: 10 MW
- Auto scroll: Zoom automatically moves in a specified direction
- History search function: Zone search, parameter search

Screen data output functions (printer)

- Destinations: Select built-in printer, external USB printer, or network printer (with the /C10 option)
- Formats Normal: Outputs hard copy of screen shot
- Fine: Zooms the displayed waveform along the time axis

Screen data output function (image saving)

- Destinations: PC card, external SCSI drive, or USB memory
  Built-in hard drive (with the /C8 option) or network drive (with the /C10 option)
- Formats: PNG, JPEG, BMP, PostScript

External I/O

- Input points: 8 bits × 2
- Input type: Switch between TTL level or contact input (with model 702911 and 702912)
- Sample rate: 10 MS/s
- Compatible probes: 700986 (non-isolated), 700987 (isolated), 702911 (non-isolated), 702912 (non-isolated)
- EXT TRIG IN/EXT TRIG OUT
  - Connector: RCA pin jack
  - Input/output level: TTL (0 to 5 V) input
- EXT Clock IN
  - Connector: RCA pin jack
  - Input level: TTL (0 to 5 V) input
  - Input frequency: Up to 1 MHz (applicable models: 701250/51/55)
    Up to 100 kHz (for modules: 701260/61/62/70/71)
    Up to 500 Hz (for module 701265)
- Communication interfaces: GP-IB, USB peripheral equipment jacks (USB keyboards and USB printers)
  USB (rev1.1 compliant for connecting to PC), Ethernet (100Base-TX and 10Base-T compliant, with /C10 option), SERIAL (RS232), SCSI
- Start/Stop input
  - Connector type: Modular jack (RJ12)
  - I/O level: TTL (0 to 5 V)
- Probe power terminal (with /P4 option)
  - Maximum number of probes powered: 4
  - Compatible probes: Current probes 701933 (30 A) and 701930 (50 A)
  - Maximum number of current probes that can be used at one time: 2

Acquisition memory backup function

Batteries	Four AA alkaline dry cells (AA/R6) (JIS, IEC type name: LR6), or four nickel-metal hydride rechargeable batteries
Backed up data	Acquisition memory and waveform data
Backup duration (approximate)	Approximately 150 hours

■ Actual backup duration will vary according to operating conditions

Media drives

Internal media drives	PC card, 40 GB hard disk drive (with /C8 option)

General specifications

Rated supply voltage	100 to 120 VAC/200 to 240 VAC (switches automatically)
Rated supply frequency	50/60 Hz
Power consumed	Approximately 200 VA-MAX
Withstand voltage	1500 VAC for one minute across power supply and ground
Insulating resistance	10 MΩ or greater at 500 VDC across power supply and ground
Exterior	Approximately 355 (W) × 250 mm (H) × 225 mm (D), excluding handle and protrusions
Weight	Approximately 8.0 kg (main unit only, with full options, including /C8, /C10, /P4) Approximately 10.3 kg (main unit and eight 701250 modules)
Operating temperature range	5°C to 40°C

Main Specifications (plug-in modules)

*1 Under standard operating conditions (temperature of 23°C ±5°C, 55% ±10% RH, warm-up of 30 min. or more), after calibration. Recommended calibration period: 1 year. Note that the strain modules (701270/71) must be balanced.

*2–*11 See the figure on page 11 for notes on the maximum input voltage and maximum allowable common mode voltage.

High-Speed 10 MS/s, 12-Bit Isolation Module (Model 701250)

Input channels		2
Input couplings		AC, DC, GND
Maximum sample rate		10 MS/s
A/D conversion resolution		12 bits (1,500 LSB/range)
Input type		Isolated unbalanced
Frequency range	(-3 dB) *1	DC, up to 3 MHz
Input range	(10:1)	500 mV to 2 kV (in steps of 1, 2, or 5)
	(1:1)	500 mV to 200 V (in steps of 1, 2, or 5)
Effective measurement range		2 times the setting range
DC offset		1/2 the setting range
Maximum input voltage (1 kHz or less)		
In combination with 700929(10:1) *2		600 V (DC + ACpeak)
Direct input	(1:1) *6, *10	250 V (DC + ACpeak)
Maximum allowable common mode voltage		
In combination with 700929 (10:1) *3		400 Vrms (CAT II), 300 Vrms (CAT II)
In combination with 701901 + 701954 (1:1) *9		400 Vrms (CAT II), 300 Vrms (CAT II)
Main unit only	(1:1) *11	42 V (DC+ACpeak) (CAT I and CAT II, 30 Vrms)
DC accuracy *1		±(0.5% of range)
Input impedance		1 MΩ ±1%, approximately 35 pF
Connector type		Isolated type BNC connector
Input filter		OFF, 500 Hz, 5 kHz, 50 kHz, 500 kHz
Temperature coefficient	Zero point	±(0.05% of range)/°C (typical value)
	Gain	±(0.02% of range)/°C (typical value)

High-Speed 1 MS/s, 16-Bit Isolation Module (Model 701251)

Input channels		2
Input couplings		AC, DC, GND
Maximum sample rate		1 MS/s
A/D conversion resolution		16 bits (24,000 LSB/range)
Input type		Isolated unbalanced
Frequency range	(-3 dB) *1	DC, up to 300 kHz (50 mV to 200 V range)
Input range	(10:1)	100 mV to 2 kV range (in steps of 1, 2, or 5)
	(1:1)	10 mV to 200 V range (in steps of 1, 2, or 5)
Effective measurement range		2 times the setting range
DC offset		1/2 the setting range
Maximum input voltage (1 kHz or less)		
In combination with 700929 (10:1) *2		600 V (DC + ACpeak)
Direct input	(1:1) *6, *10	140 V (DC + ACpeak)
Maximum allowable common mode voltage		
In combination with 700929 (10:1) *3		400 Vrms (CAT II), 300 Vrms (CAT II)
In combination with 701901 + 701954 (1:1) *9		400 Vrms (CAT II), 300 Vrms (CAT II)
Main unit only	(1:1) *11	400 V (DC+ACpeak) (CAT I and CAT II, 30 Vrms)
DC accuracy *1		50 mV to 200 V ± (0.25% of range)
		20 mV range ± (0.3% of range)
		10 mV range ± (0.5% of range)
Input impedance		1 MΩ ± 1%, approximately 35 pF
Connector type		Isolated type BNC connector
Input filter		OFF, 400 Hz, 4 kHz, 40 kHz
Temperature coefficient	Zero point	50 mV to 20 V range ±(0.02% of range)/°C (typical value)
		20 mV range ±(0.05% of range)/°C (typical value)
		10 mV range ±(0.10% of range)/°C (typical value)
	Gain	10 mV to 200 V range ±(0.02% of range)/°C (typical value)

High-Voltage 100 kS/s, 16-Bit Isolation Module (with RMS) (Model 701260)

Input channels		2
Input couplings		AC, DC, GND, AC-RMS, DC-RMS
Maximum sample rate		100 kS/s
A/D conversion resolution		16 bits (24,000 LSB/range)
Input type		Isolated unbalanced
Frequency range	(-3 dB) *1	
Waveform measurement mode		DC, up to 40 kHz
RMS mesurement mode		DC, 40 Hz to 10 kHz
Input range	(10:1)	2 V to 20 kV range (in steps of 1, 2, or 5)
	(1:1)	200 mV to 2 kV range (in steps of 1, 2, or 5)
Effective measurement range		2 times the setting range
DC offset		1/2 the setting range
Maximum input voltage (1 kHz or less)		
In combination with 700929 (10:1) *2		1000 V (DC + ACpeak)
In combination with 701901 + 701954 (1:1) *6		850 V (DC + ACpeak)
Maximum allowable common mode voltage (1 kHz or less)		
In combination with 700929 (10:1)		H side: 1000 Vrms (CAT II)*4, L side: 400 Vrms (CAT II)*5
In combination with 701901 + 701954 (1:1)		H side: 700 Vrms (CAT II)*7, L side: 400 Vrms (CAT II)*8
Direct input (when using a cable that does not conform with the safety standard)		H/L sides: 30 Vrms (42 VDC+ACpeak)*11
DC accuracy (waveform measurement mode)*1		± (0.25% of range)
DC accuracy (RMS measurement mode)*1		± (1.0% of range)
AC accuracy (RMS measurement mode)*1		
Sinewave input		± (1.5% of range)
Crest factor 2 or less		± (2.0% of range)
Crest factor 3 or less		± (3.0% of range)
Input impedance		1 MΩ ± 1%, approximately 35 pF
Connector type		Isolated type BNC connector
input filter		OFF, 100 Hz, 1 kHz, 10 kHz
Temperature coefficient (waveform measurement mode)		
Zero point		±(0.02% of range)/°C (typical value)
Gain		±(0.02% of range)/°C (typical value)
Response time (in RMS measurement mode)		
Rise 0->90% of range		100 ms typ.
Fall 100->10% of range		250 ms typ.
Crest factor (RMS measurement only)	3 or less	

■ Please use 701901 (1:1 safety adaptor lead) or 700929 (10:1 safety probe) which conforms with the safety standard, for high-voltage input.

■ Using cables that do not conform to safety standards is very dangerous.

Frequency Module (Model 701280)

- Frequency measurement section

Input channels		2
Data update rate		25 kHz (40 µs)
Measurement range(Frequency)		0.01 Hz to 200 kHz
Measurement range(Frequency)		1 Hz to 500 kHz range
Minimum measurement resolution		50 ns (20 MHz)

- Input section

Compatible input signals		Encoder pulse input of up to ± 42 V Electromagnetic pickup input (power generator type)*6 AC power supply input of up to 300 Vrms (model 700929 isolation probe required)
Input type		Isolated unbalanced
Input couplings		AC, DC
Input voltage ranges (±FS)	(1:1)	± 1 V to ± 50 V (6 ranges, steps of 1, 2, or 5)
	(10:1)	± 10 V to ± 500 V (6 ranges, steps of 1, 2, or 5)
Maximum input voltage (1 kHz or less)		
In combination with 700929 (10:1)*2		420 V (DC + ACpeak)
Direct input	(1:1)*10	420 V (DC + ACpeak)
Maximum allowable common mode voltage		
In combination with 700929 (10:1)*3		300 Vrms (CAT II)
Direct input	(1:1)*11	42 V (DC+ACpeak) 30 Vrms (CAT II)
Input impedance		1 MΩ ± 1%, approximately 35 pF
Connector type		Isolated type BNC connector
Input filters		OFF, 100 Hz, 1 kHz, 10 kHz, 100 kHz
Input pull-up function (can be turned ON/OFF)		Supports open collector, mechanical contact output, 4.7 kΩ (+5 V)
Chattering elimination function		Setting time 1 ms to 1000 ms
Comparator section Preset		Logic (5 V, 3 V, 12 V, 24 V), electromagnetic pickup, zero cross, pull-up (5 V), AC100V, AC200V, user-defined
Threshold range		± FS range, resolution 1% units
Hysteresis		±1%, ±2.5%, ±5% of FS
LED display (per CH) ACT (green)		Operating status (lights during pulse input)
OVER (red)		Overdrive status (lights when input exceeds range)
Compatible probes/cables		(10:1 probe) 700929/701940 (1:1 cable) 366926

Main Specifications (plug-in modules)

- Measurement function details

Measurable parameters: (Frequency (Hz), rpm, rps, period (sec), duty (%), power supply frequency (Hz), pulse width (sec), pulse integration, speed

Effective measurement range: 2 times the setting range

Resolution of measured data: 16 bit (24,000 LSB/range)

Measured parameters and measuring range

Measured parameter	Measuring Range	Range
Frequency (Hz)	0.01 Hz to 200 kHz	1 Hz to 500 kHz
Rpm	0.01 rpm to 100,000 rpm	1 rpm to 100,000 rpm
Rps	0.001 rps to 2000 rps	0.1 rps to 2,000 rps
Period (sec)	5 µs to 50 s	100 µs to 50 s
Duty (%)	0% to 100%	10% to 200%
Power supply frequency (Hz)	(50 Hz, 60 Hz, 400 Hz)±20 Hz	1 Hz to 20 Hz
Pulse width (sec)	2 µs to 50 s	100 µs to 50 s
Pulse integration	Up to 2×10^{9} count	100×10^{-20}/div to 500×10^{21}/div
Speed	Measuring range same as frequency (units can be converted to km/h, etc.)	

Auxiliary measurement functions

Smoothing filter (Moving average)	A moving average is applied to smooth the observed stair-step shaped waveform. The moving average orders are based on a specified time (moving average order = set time ÷ 40 µs). Filters are set at 0.1 ms to 1000 ms for reducing jitter and increasing resolution.
Pulse average function	A mode in which a specified number of pulses are measured together and averaged, with a specifiable number of pulses from 1 to 4096. It has the same effect as the smoothing filter, but averaging is performed at the pulse interval. Even if the encoder interval is uneven, pulses can be measured together and averaged out.
Deceleration prediction	Automatically compensates for lack of information on encoder pulses occurring during deceleration (application of the brake) and calculates a deceleration curve.
Stop prediction (braking application)	A stop is inferred if no pulses are input for a period of time, and output is set to 0. Up to 10 steps can be specified.
Offset observation function	You can set the observational center and zoom the surrounding fluctuations (supports fluctuation observation). Offset setting range = (range 3 100)

■ Power generation electromagnetic pickup: Given output within 0.2 Vpp to 42 Vpp. Minimum sensitivity is 0.2 V (at 1:1) or more, connected with 1:1 cable. For types that require a power supply or terminal resistance, apply to the sensor side.

■ Minimum input must be 0.2 Vpp or more. Measurement conditions:
- During frequency/period measurement: 1 Vpp/1 µs square wave input (range = ±10 V, bandwidth = FULL, and hysteresis = ± 1%)
- During DUTY/pulse width measurement: 1 Vpp/5 ns square wave input (range = ±10 V, bandwidth = FULL, and hysteresis = ± 1%)
- During power supply frequency measurement: 90 Vrms sinewave input (range = AC1000V, BW = 100 kHz)

Measurement accuracy*1

- Frequency/Revolution/Velocity measurements

Measurement accuracy: ± (0.05% of range + accuracy depends on the input waveform frequency)

Accuracy depends on the input waveform frequency:

1 Hz to 2 kHz:	0.05% of input waveform frequency + 1 mHz
2 kHz to 10 kHz	0.1% of input waveform frequency
10 kHz to 20 kHz	0.3% of input waveform frequency
20 kHz to 200 kHz	0.5% of input waveform frequency

- Period measurement

Measurement accuracy: ± (0.05% of range + accuracy depends on the input waveform interval)

Accuracy depends on the input waveform interval

500 µs to 50 s	0.05% of input waveform interval
100 µs to 500 µs	0.1% of input waveform interval
50 µs to 100 µs	0.3% of input waveform interval
5 µs to 50 µs	0.5% of input waveform interval + 0.1 µs

- Duty measurement

Accuracy depends on the input waveform frequency

0.1 Hz to 1 kHz	±0.1% of 100%
1 kHz to 10 kHz	± 0.2% of 100%
10 kHz to 50 kHz	± 1.0% of 100%
50 kHz to 100 kHz	± 2.0% of 100%
100 kHz to 200 kHz	± 4.0% of 100%

- Pulse width measurement

Measurement accuracy: ± (0.05% of range + accuracy depends on input waveform pulse width)

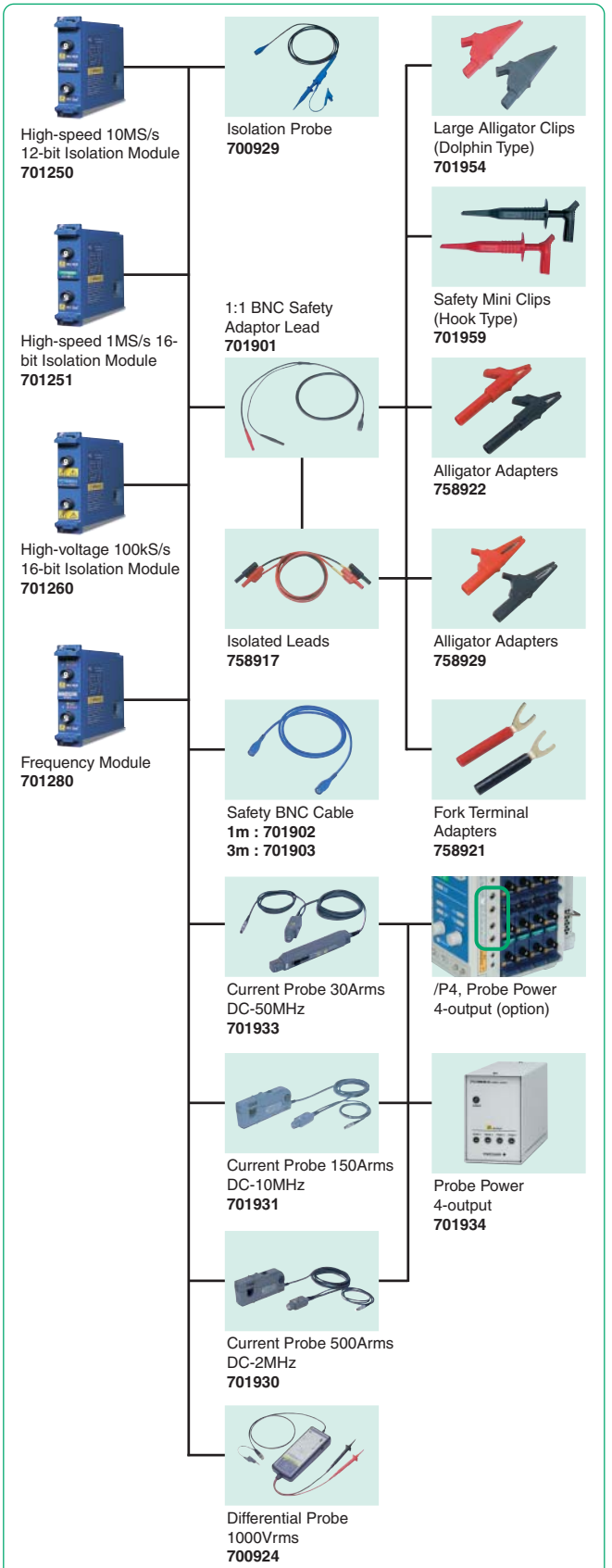
Accuracy depends on input waveform pulse width

500 µs to 100 s	0.05% of input waveform pulse width
100 µs to 500 µs	0.1% of input waveform pulse width
50 µs to 100 µs	0.3% of input waveform pulse width
2 µs to 50 µs	0.5% of input waveform pulse width + 0.1 µs

- Power supply frequency measurement

Measurement accuracy: Center frequency at 50, 60 Hz, accuracy of ±0.03 Hz, resolution of 0.01 Hz
Center frequency at 400 Hz, accuracy of ±0.03 Hz, resolution of 0.01 Hz

Example of accessory combinations



■ The actual voltage that can be used is the lowest of the specification for the module, cable, or adapter.

Main Specifications (plug-in modules)

High-Speed 10 MS/s, 12-Bit Non-Isolation Module (Model 701255)

Input channels		2
Input couplings		AC, DC, GND
Maximum sample rate		10 MS/s
A/D conversion resolution		12 bits (1,500 LSB/range)
Input type		Non-Isolated unbalanced
Frequency range	(-3 dB)*1	DC, up to 3 MHz
Input range	(10:1)	500 mV to 2 kV range (in steps of 1, 2, or 5)
	(1:1)	50 mV to 200 V range (in steps of 1, 2, or 5)
Effective measurement range		2 times the setting range
DC offset		1/2 the setting range
Maximum input voltage (1 kHz or less)		
In combination with 701940	(10:1)	600 V (DC + ACpeak)
Direct input	(1:1)	250 V (DC + ACpeak)
DC accuracy*1		± (0.5% of range)
Input impedance		1 MΩ ± 1%, approximately 35 pF
Connector type		Metal type BNC connector
Input filter		OFF, 500 H, 5 kHz, 50 kHz, 500 kHz
Temperature coefficient	Zero point	±(0.05% of range)/°C (typical value)
	Gain	±(0.02% of range)/°C (typical value)
Adaptive passive probe	(10:1)	701940

Acceleration/Voltage Module (with AAF) (Model 701275)

Input channels	2
Input type	Switchable between acceleration and voltage input AAF (anti-aliasing filter) supports both acceleration and voltage
Input couplings	(AC coupling for acceleration) ACCL, (voltage) AC, DC, GND
Maximum sample rate	100 kS/s
A/D conversion resolution	16 bit (24,000 LSB/range)
Input type	Isolated unbalanced
Frequency band (-3 dB)*1	(Acceleration) 0.4 Hz to 40 kHz (Voltage) DC, up to 40 kHz
AC coupling, Acceleration/voltage	0.4 Hz or less
Input range	
For acceleration (± 5 V = × 1 range)	X0.1– × 1–X100 (in steps of 1, 2, or 5)
For voltage (10:1)	500 mV range to 1 kV range (in steps of 1, 2, or 5)
For voltage (1:1)	50 mV range to 100 V range (in steps of 1, 2, or 5)

■ This module's insulation is functional insulation. Even when using a probe, 42 V or higher input is not considered safe.

Effective measurement range	2 times the setting range
DC offset	1/2 the setting range
Maximum input voltage (1 kHz or less)	42 V (DC + ACpeak)
Maximum allowable common mode voltage*11	42 V (DC+ACpeak) 300 Vrms (CAT II)
Accuracy*1	For voltage (DC accuracy) ± (0.25% of range)
	For acceleration (AC accuracy) ± (0.5% of range) (at 1 kHz)
Input impedance	1 MΩ ± 1%, approximately 35 pF
Connector type	Metal type BNC connector
Input filters	OFF, Auto (AAF), 4 kHz, 400 Hz, 40 Hz
Anti-aliasing filter (AAF)	
Cutoff frequency	(when fs=50 Hz to 100 kHz, fs ≤ 50 Hz, fc is fixed to 20 Hz) fc (cutoff frequency) = fs (sampling frequency) × 40% fc automatically linked with the sampling frequency.
Cutoff characteristics	–65 dB at 2 × fc (typical)
Temperature coefficient (for voltage) (excluding when filter = AUTO)	
Zero point	±(0.02% of range)/°C (typical value)
Gain	±(0.02% of range)/°C (typical value)
Acceleration sensor bias (constant current drive)	Constant current drive = 4 mA ±10%, voltage 22 V
Examples of compatible acceleration sensors:	Built-in amp type: Kistler Instruments Corp., Piezotron®; PCB Piezotronics Inc., ICP®; Endevco Corp., Isotron2® Something that supports acceleration sensor and bias is 4 mA/22 V.

■ Piezotron is a registered trademark of Kistler Instrument Corp. ICP is a registered trademark of PCB Piezotronics Inc. Isotron2 is a registered trademark of Endevco Corp.

Sensor usage notes:	Sensors are sensitive to physical shock and heat. If shocks or temperature changes occur that are outside of the standard operating conditions, measurement may not be possible for several minutes.
Compatable probes/cables for voltage	(10:1 probe) 701940/700929 (1:1 cable) 366926

Strain Module (NDIS) (Model 701270)

Input channels	2
Input types	DC bridge input (automatic balancing), balanced differential input, DC amplifier (floating)
Automatic balancing	Electronic auto-balance
Automatic balancing range	±10,000 ΩSTR (1 gauge method)
Bridge voltages	Select 2 V, 5 V, or 10 V
Gauge resistances	120 Ω to 1000 Ω (bridge voltage 2 V)
	350 Ω to 1000 Ω (bridge voltage 2 V, 5 V, 10 V)
Gauge rate	1.90 to 2.20 (variable in 0.01 steps)
A/D resolution	16 bits (48,000 LSB/± FS: Upper = +FS and Lower = -FS)
Maximum sample rate	100 kS/s
Frequency range (-3 dB)*1	DC, up to 20 kHz
DC accuracy*1	± (0.5% of FS +5 µSTR)
Measurement range/measurable range	

Measurement range (FS)	Measurable range (_FS to +FS)
500 µSTR	-500 µSTR to 500 µSTR
1000 µSTR	-1000 µSTR to 1000 µSTR
2000 µSTR	-2000 µSTR to 2000 µSTR
5000 µSTR	-5000 µSTR to 5000 µSTRR
10,000 µSTR	-10,000 µSTR to 10,000 µSTR
20,000 µSTR	-20,000 µSTR to 20,000 µSTR

mV/V range support	mV/V range = 0.5 × (µSTR range/1000)
Maximum allowable input voltage (1 kHz or less)	10 V (DC + ACpeak)
Maximum allowable common mode voltage	42 V (DC+ACpeak) (CAT I & CAT II, 30 VrmsI)
Temperature coefficient Zero point	±5 µSTR/°C(typical value)
Gain	±(0.02% of FS)/°C (typical value)
Internal filter	OFF, 1 kHz, 100 Hz, 10 Hz
Input connector	NDIS standard
Accessory (set of solderable connector shells)	NDIS connector (A100JC), 1 unit
Recommended bridge head (NDIS type) (sold separately)	701955 (120 Ω) (comes with 5 m cable)
	701956 (350 Ω) (comes with 5 m cable)

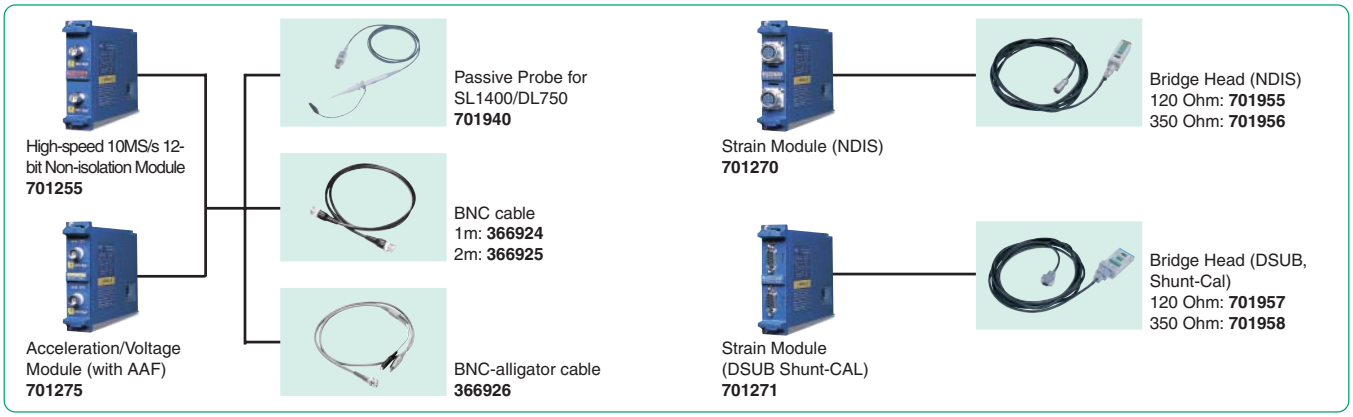
Strain Module (supports DSUB shunt cal) (Model 701271)

Input channels	2
Input types	DC bridge input (automatic balancing), balanced differential input, DC amplifier (floating)
Automatic balancing method	Electronic auto-balance
Automatic balancing range	±10,000 µSTR (1 gauge method)
Bridge voltages	Select 2 V, 5 V, or 10 V
Gauge resistances	120 Ω to 1000 Ω (bridge voltage 2 V)
	350 Ω to 1000 Ω (bridge voltage 2 V, 5 V, 10 V)
Gauge rate	1.90 to 2.20 (can be set in 0.01 steps)
A/D resolution	16 bit (48,000 LSB/± FS: Upper = +FS and Lower = -FS)
Maximum sample rate	100 kS/s
Frequency range (_3 dB)*1	DC, up to 20 kHz
DC accuracy*1	±(0.5% of FS + 5 µSTR)
Measurement range/measurable range	

Measurement range (FS)	Measurable range (_FS to +FS)
500 µSTR	-500 µSTR to 500 µSTR
1000 µSTR	-1000 µSTR to 1000 µSTR
2000 µSTR	-2000 µSTR to 2000 µSTR
5000 µSTR	-5000 µSTR to 5000 µSTR
10,000 µSTR	-10,000 µSTR to 10,000 µSTR
20,000 µSTR	-20,000 µSTR to 20,000 µSTR

mV/V range support	mV/V range = 0.5×(µSTR range /1000)
Maximum allowable input voltage (1 kHz or less)	10 V (DC + ACpeak)
Maximum allowable common mode voltage	42 V (DC+ACpeak) (CAT I & CAT II, 30 Vrms)
Temperature coefficient Zero point	±5 ×STR/°C(typical value)
Gain	±(0.02% of FS)/°C (typical value)
Internal filter	OFF, 1 kHz, 100 Hz, 10 Hz
Input connector	DSUB
Accessory (set of solderable connector shells)	DSUB connector, 1 unit
Recommended bridge head (supports DSUB shunt CAL) (sold separately)	701957 (120 Ω) (with 5 m cable)
	701958 (350 Ω) (with 5 m cable)

Module Accessories



Main Specifications (plug-in modules)

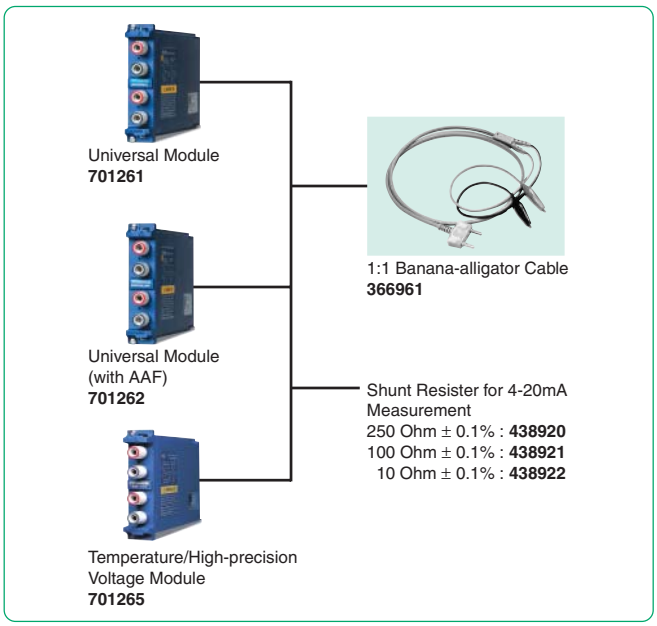
Universal (Voltage/Temperature) Modules (701261/701262)

Input channels		2
Input signals		Voltage or temperature (thermocouple)
AAF (anti-aliasing filter)		701261: none, 701262: included
Input couplings		TC (thermocouple), DC, AC, GND
Input types		Isolated unbalanced
Maximum sample rate	Voltage	100 kS/s
Data updating rate	Temperature	500 Hz
A/D conversion resolution		Voltage, 16 bits (24,000 LSB/range), temperature, 0.1°C resolution
Frequency range (-3 dB)*1	Voltage	DC, up to 40 kHz
	Temperature	DC, up to 100 Hz
Input range	Voltage (1:1)	50 mV to 200 V range (10 div display, steps of 1, 2, or 5)
	Temperature	K, E, J, T, L, U, N, R, S, B, W, iron doped gold/chromel
Effective measurement range (voltage)		2 times the setting range
DC offset (voltage)		1/2 the setting range
DC accuracy*1 (voltage)		± (0.25% of range)

Temperature measured range/accuracy*1
(Reference junction temperature compensation accuracy is not included)

Type	Measured range	Accuracy
K	-200°C to 1300°C	±(0.1% of reading + 1.5°C)
E	-200°C to 800°C	However, for -200°C to 0°C:
J	-200°C to 1100°C	±(0.2% of reading + 1.5°C)
T	-200°C to 400°C	
L	-200°C to 900°C	
U	-200°C to 400°C	
N	0°C to 1300°C	
R, S	0°C to 1700°C	±(0.1% of reading + 3°C) However, for 0°C to 200°C: ±8°C 200°C to 800°C: ±5°C
B	0°C to 1800°C	±(0.1% of reading + 2°C) However, for 400°C to 700°C: ±8°C The effective range is 400°C to 1800°C
W	0°C to 2300°C	±(0.1% of reading + 3°C)
Gold/chromel	0 K to 300 K	0 to 50 K: ±4 K 50 to 300 K: ±2.5 K

Maximum input voltage (1 kHz or less)		42 V (DC + ACpeak) Since the input connector is of a binding post type, when the following safety standards are met, it is possible to touch the metal part of the connector. Therefore for safety reasons, the maximum value is 42 V (DC+ACpeak). 150 V (DC+ACpeak): Input section maximum allowable voltage (maximum value at which the input circuit will not be damaged)
Maximum allowable common mode voltage (1 kHz or less)		42 V (DC+ACpeak) (CAT I & CAT II, 30 Vrms)
Input connector		Binding post
Input impedance		Approximately 1 M Ω
Input filters	Voltage	OFF, AUTO (AAF), 4 kHz, 400 Hz, 40 Hz (-12 dB, oct, except AUTO)
	Temperature	OFF, 30 Hz, 8 Hz, 2 Hz
AAF (anti-aliasing filter)		when fs = 50 Hz to 100 kHz, fs <= 50 Hz or less is fixed to fc = 20 Hz 701262 only Cutoff frequency fc = fs (sampling frequency) × 40% fc is automatically linked with the sampling frequency. Cutoff characteristics: -65 dB at 2Xfc (typical)
Temperature coefficient (for voltage)		Except when Filter = AUTO
	Zero point	±(0.01% of range)/°C (typical value)
	Gain	±(0.02% of range)/°C (typical value)
Compatable cable		366961 (banana-to-aligator clip, 1:1)



Temperature/High-Precision Voltage Module (701265)

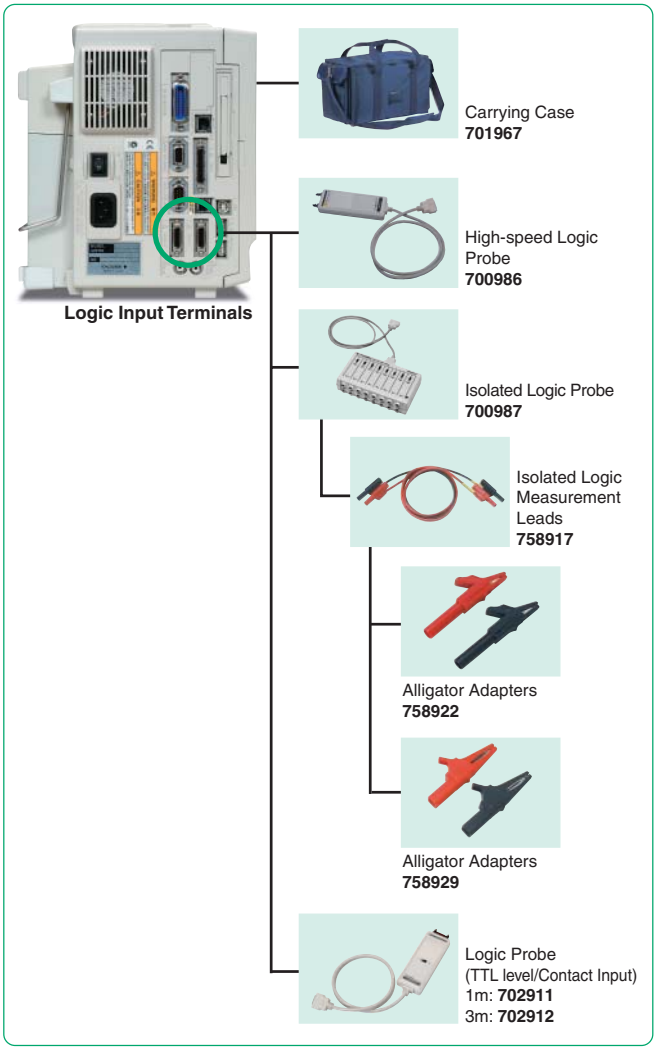
Input channels	2
Input couplings	TC (thermocouple), DC, GND
Input type	Isolated unbalanced
Applicable sensors (Input couplings: TC)	K, E, J, T, L, U, N, R, S, B, W, iron doped gold/chromel
Data updating rate	500 Hz
Frequency range (-3 dB)*1	DC, up to 100 Hz
Voltage accuracy*1 (in voltage mode)	± (0.08% of range + 2 μV)

Temperature measurement range/accuracy*1
(Reference junction temperature compensation accuracy is not included)

Type	Measured Range	Accuracy
K	-200°C to 1300°C	±(0.1% of reading + 1.5°C)
E	-200°C to 800°C	However, for -200°C to 0°C:
J	-200°C to 1100°C	±(0.2% of reading + 1.5°C)
T	-200°C to 400°C	
L	-200°C to 900°C	
U	-200°C to 400°C	
N	0°C to 1300°C	
R, S	0°C to 1700°C	±(0.1% of reading + 3°C) However, for 0°C to 200°C: ±8°C However, for 200°C to 800°C: ±5°C
B	0°C to 1800°C	±(0.1% of reading + 2°C) However, for 400°C to 700°C: ±8°C The effective range is 400°C to 1800°C
W	0°C to 2300°C	±(0.1% of reading + 3°C)
Iron doped gold/chromel	0 to 300 K	0 to 50 K: ±4 K 50 to 300 K: ±2.5 K

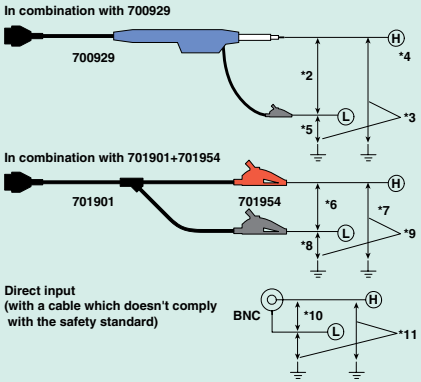
Maximum input voltage (1 kHz or less)		42 V (DC+ACpeak) (CAT I & CAT II, 30 VrmsI)
Input range (for 10 div display)		1 mV to 100 V range (in 1/2/5 steps)
Input connector		Binding post
Input impedance		Approximately 1 M Ω
Input filter		OFF, 2 Hz, 8 Hz, 30 Hz
Temperature coefficient (voltage)		
	Zero point	±(0.01% of range)/°C + 0.5 μV/°C (typical value)
	Gain	±(0.02% of range)/°C (typical value)

Logic Probe Accessories and Carrying Case



Maximum Input Voltage/Maximum Allowable Common Mode Voltage

See Specifications of Plug-in Modules



⚠ Warning

Do not exceed the maximum input voltage, withstand voltage, or surge current. In order to prevent electric shock, be sure to ground the main unit. In order to prevent electric shock, be sure to tighten the module's screws. Otherwise, electrical protective functions and mechanical protective functions will not be effective.

Logic Probe (702911: 1 m, 702912: 3 m)

Number of inputs	8
Input types	Non-isolated (common ground for all bits, main unit logic inputs and bits share common ground)
Maximum input voltage	±35 V
Response time	3 µs or less
Input impedance	10 kΩ or higher
Threshold level	Approximately 1.4 V
Input method	TTL level or contact input (switchable)

High-Speed Logic Probe (700986)

Number of inputs	8
Input types	Non-isolated (common ground for all bits; logic module and bits share common ground)
Maximum input voltage (1 kHz or less) (between probe tip and case ground)	42 V (DC +ACpeak) (CAT I and II, 30 Vrms)
Response time	1 µS or less
Input impedance	Approximately 100 kΩ
Threshold level	Approximately 1.4 V

Isolated Logic Probe (700987)

Number of inputs	8
Input types	Isolated (all individual bits are isolated)
Input connector	Safety connector (banana plug) × 8
Input switching capability	AC/DC input switching for each bit
Applicable input ranges	DC input H/L detection for 10 V DC to 250 V DC AC input H/L detection (50/60 Hz) for 80 V AC to 250 V AC
Threshold levels	DC input 6 V DC ± 50% AC input 50 V AC ± 50%
Response times	DC input 1 ms or less AC input 20 ms or less
Maximum input voltage (1 kHz or less)	(between H and L of each bit) 250 Vrms (CAT I and II)
Maximum allowable in-phase voltage	250 Vrms (CAT I and II)
Maximum allowable voltage between bits	250 Vrms (CAT I and II)
Input impedance	Approximately 100 kΩ