

High Voltage Differential Probe

GDP-2035H (3500 V_{pk} / 200 MHz)

USER MANUAL



ISO-9001 CERTIFIED MANUFACTURER

GW INSTEK

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S SAFETY INSTRUCTIONS

This chapter contains important safety instructions that you must follow during operation and storage. Read the following before any operation to ensure your safety and to keep the instrument in the best possible condition.

Safety Symbols

These safety symbols may appear in this manual or on the instrument.



WARNING

Warning: Identifies conditions or practices that could result in injury or loss of life.



CAUTION

Caution: Identifies conditions or practices that could result in damage to the GDP-2035H or other property.



DANGER High Voltage



Attention Refer to the Manual



Protective Conductor Terminal



Earth (ground) Terminal



Do not dispose of electronic equipment as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased.

Safety Guidelines

General Guideline • To prevent electric shock, do not use the probe to measure voltages outside its rated range.

CAUTION

- Do not use the probe in damp or potentially explosive environments.
- Ensure that the circuit under test is de-energized before connecting the probe.
- After measurement, de-energize the circuit under test before removing the probe.
- Ensure that the oscilloscope and other connected devices are properly grounded.
- Inspect the probe and accessories before use. Discontinue use immediately if any part is damaged or any conductor is exposed.

Operation Environment

- Relative Humidity: $\leq 85\%$ RH
- Altitude: < 3000 m
- Temperature: $0\text{ }^{\circ}\text{C}$ to $45\text{ }^{\circ}\text{C}$

(Pollution Degree) EN61010-1 specify the pollution degrees and their requirements as follows. The GDP-2035H falls under pollution degree 2.

Pollution refers to "addition of foreign matter, solid, liquid, or gaseous (ionized gases), that may produce a reduction of dielectric strength or surface resistivity".

Storage environment

- Relative Humidity: $\leq 90\%$ RH
 - Temperature: $-30\text{ }^{\circ}\text{C}$ to $70\text{ }^{\circ}\text{C}$
-

Disposal

Do not dispose of this instrument as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased. Please make sure discarded electrical waste is properly recycled to reduce environmental impact.

SUMMARY

The GDP-2035H is a high-voltage, high-frequency differential probe with floating ground measurement function. It supports a differential voltage of up to 3500 Vpk and bandwidth of 200 MHz, and the typical accuracy of 2 % meets the requirements of most measurement systems. GDP-2035H has standard BNC output connector, allowing it to operate with oscilloscopes from any manufacturer.

Product Characteristics

- Bandwidths up to 200 MHz
- Up to 3500 V Differential (dc + peak ac)
- Overrange Indicator
- Safety Certified
- Switchable Attenuation

GDP-2035H Brief Description

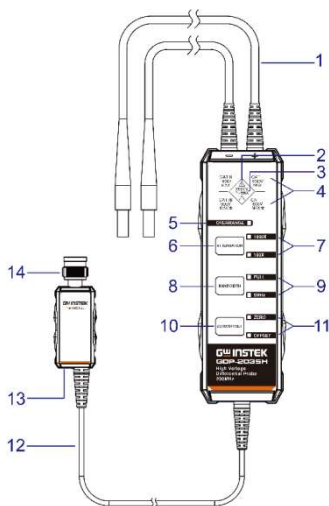
Type	GDP-2035H
Maximum input differential voltage (dc + peak ac)	100 X: ± 350 V 1000 X: ± 3500 V
Common mode voltage	± 3500 V
Bandwidth	200 MHz
Attenuation ratio	100 X / 1000 X

AAPPLICATIONS

- Floating Measurements
 - Variable-frequency Drive (VFD)
 - Switching Power Supply Design
 - Motor Drive Design
 - Electronic Ballast Design
 - Power Converter Design and Service
 - Power Device Evaluation
-

P PRODUCT AND ACCESSORIES

Probe Main Part



Detailed Instruction

- 1 Differential Input Cable (280 mm): The differential input cable terminates in standard 4 mm banana plugs. You can connect it to various standard probe clamps or an extension cable (approximately 1 m) to increase the length of the input cable. Please be aware that high-frequency performance may degrade when an extension cable is used, and waveform oscillation may occur due to the reduced bandwidth.

-
- 2 Safety alarm symbol.

 - 3 Maximum differential input voltage symbol.

 - 4 The maximum input to ground voltage under CAT level environment.

 - 5 Overload indicator: Lights red and sounds the buzzer when the measured signal exceeds the range.

 - 6 ATTENUATION: Different attenuation ratios correspond to different ranges, for instance, 1000 X corresponds to a maximum differential voltage of 3500 V, and the maximum differential voltage of 100 X is 350 V. For your oscilloscope to display the voltage value correctly, please set up the attenuation ratio accordingly.

 - 7 Attenuation-ratio indicator: Lights green for corresponding attenuation ratio.

 - 8 BANDWIDTH: Select the 5 MHz bandwidth-limit function to reduce high-frequency interference.

 - 9 Bandwidth indicator: Lights green for corresponding bandwidth (FULL or 5 MHz)

 - 10 ZERO/OFFSET button: press briefly for offset mode; press for 1.5 s for zero-adjustment mode.

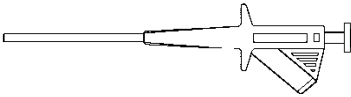
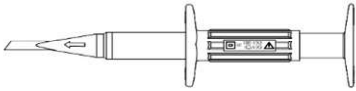
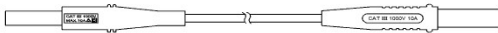
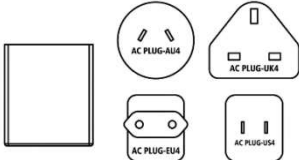
 - 11 ZERO/OFFSET indicator light: blinks while the corresponding mode is in progress and remains lit after the process is complete.

 - 12 Signal and power supply transmission cable: 1.5 m.

 - 13 Standard Type-C power supply connector: accepts power from a USB adapter, oscilloscope, or USB portable power supply.

 - 14 Standard BNC signal output connector: can be connected to any oscilloscope.

Accessories

Diagram	Description
	Alligator clip
	Pincer Clip
	Test Hook
	Test Lead, 1 m
	USB Cable A to C, 1.2 m
	Banana head female socket, Ø 4 mm
	Power Adapter with Interchangeable AC Plugs (AU/ US/ UK/ EU)

Accessories Introduction



Item	Description	Qty.
1	Alligator Clips (Red x 1, Black x 1)	2
2	Pincer Clips (Red x 1, Black x 1)	2
3	Test Hooks (Red x 1, Black x 1)	2
4	Banana Head Female Sockets, ϕ 4 mm	2
5	Power Adapter (5 V, 2.4 A USB)	1
6	Interchangeable AC Plugs (AU/US/UK/EU)	1
7	Test Leads, 1 m (Red x 1, Black x 1)	2
8	USB CABLE A-C, 1.2 m	1

PERATING STEPS

Steps

1. Before testing, always estimate the amplitude of the common mode voltage and differential voltage being measured. Exceeding the limits may cause personal injury or damage to the probe.
2. Choose the proper probe clamp and connect it to the circuit under test, connect the output cable to the oscilloscope or other measurement devices.
3. Connect the power supply of the probe.
4. Choose the proper attenuation ratio according to the voltage to be measured. The overvoltage indicator will light and buzzer will be activated when the voltage exceeds the range.
5. Set up the attenuation ratio of the oscilloscope or other measurement devices according to the attenuation ratio of the probe. Adjust the vertical scale of the oscilloscope according to the voltage measured.
6. Move the probe main body as far as possible from the high voltage pulse circuit to reduce interference during testing.
7. Switch off the power supply of the circuit under test before removing the probe after testing.

Steps for auto zero set and offset elimination

Steps

1. **Auto zero set function:** supports online zero set, no need to disconnect from the circuit under test during zero set.

Press  button for around 1.5 s until the ZERO indicator light starts blinking, then release the button.

When the buzzer beeps twice, it means that the zero set is complete, and the ZERO indicator light will remain lit.

2. **Bias voltage elimination function:** able to eliminate the bias voltage in all ranges, making the probe able to accurately measure the ripple voltage. The measurement accuracy will be improved if you choose the 20 MHz bandwidth option on the oscilloscope. The steps are shown below:

Press  button briefly, and the OFFSET indicator light will start blinking when the offset zero set mode is activated.

When the buzzer beeps twice, it indicates that the bias elimination is complete, and the OFFSET indicator light will remain lit.

Precautions for Use

Note

The input impedance of the probe and oscilloscope must be paired to receive the correct measurement result.

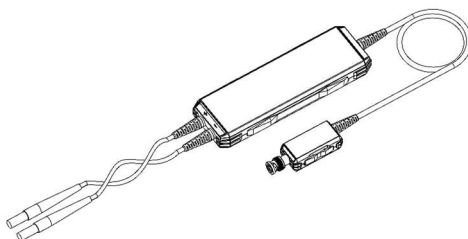
For best measurement performance when using the input extension lead wire, operate at frequencies below 5 MHz. At frequencies above 5 MHz, measurement errors may occur.

		Oscilloscope (over 350 MHz)		Oscilloscope (below 200 MHz)	
		50 Ω	1 M Ω	1 M Ω	External through type 50 Ω load
Probe	50 Ω	Correct	The signal amplitude is twice normal. The waveform oscillates.	The signal amplitude is twice normal. The waveform oscillates.	Correct
	1 M Ω	The output signal amplitude is half the normal value.	Correct	Correct	

Steps

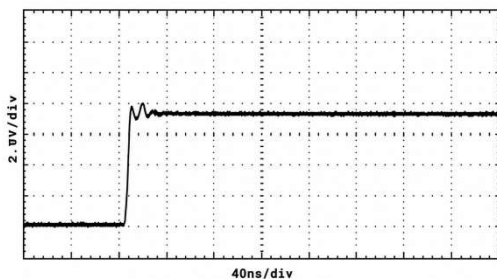
1. During measurement, try to minimize the area encircled by both input cables, such as double line parallel or twisted pair. This helps reduce inductance, maintain bandwidth, and minimize environmental electromagnetic interference.

What a twisted pair looks like:

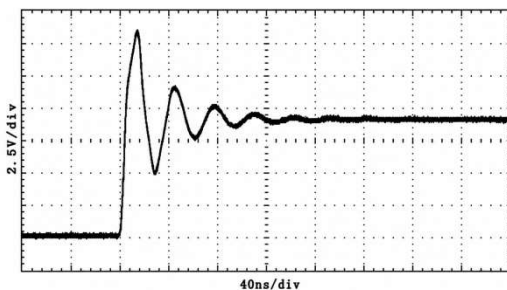


Please be aware that the high-frequency characteristics will degrade if an extension cable is used. The bandwidth will decrease and cause oscillation as shown below:

Waveform without extension cable

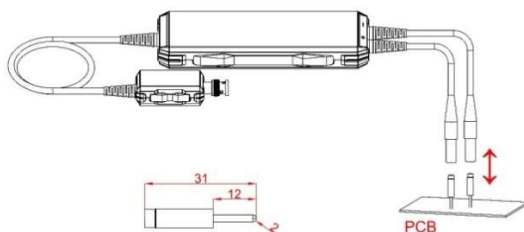


Waveform with extension cable



2. To utilize the probe's full 200 MHz bandwidth while reducing waveform oscillation, use the banana head female socket that is supplied with the probe to connect to the circuit under test.

As shown in the picture below:



M AINTENANCE

- Keep the probe dry and clean.
 - Clean the probe with a dry cloth. Do not use chemical cleaning solutions.
 - Return the probe to its packaging and store it in a cool, clean, and dry place.
 - The original packaging provides shock protection. Keep the probe in its packaging during transportation.
 - Do not pull, excessively twist, or knot the cable.
-

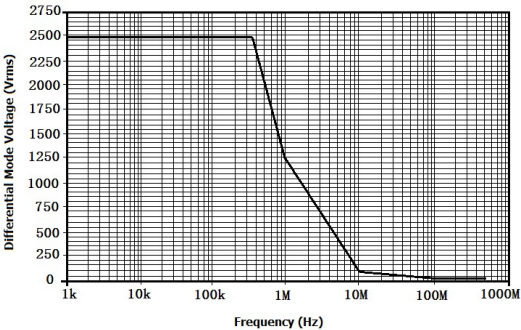
A PPENDIX

Electrical Specifications

Model	GDP-2035H
Bandwidth (-3 dB)	200 MHz
Rise time	1.75 ns (calculated)
Accuracy	± 2 %
Attenuation ratio	100 X / 1000 X
Maximum differential voltage (dc + peak ac)	100 X: ± 350 V 1000 X: ± 3500 V
Common mode voltage	± 3500 V
Maximum differential mode voltage vs frequency curve	Refer to Fig. 1
Maximum Input Voltage-to- Earth (Vrms)	600 V CAT III 1000 V CAT II
Differential Input Impedance (Typical)	40 MΩ 2 pF
Input Impedance between each Input and Ground (Typical)	20 MΩ 4 pF
CMRR	DC: > 80 dB
	100 kHz: > 60 dB
	1 MHz: > 50 dB
Noise (Vrms)	100 X: < 220 mV
	1000 X: < 280 mV
Threshold value of voltage overload indication	100 X: ≥ 350 V
	1000 X: ≥ 3500 V
Delay time	100 X: 12.2 ns
	1000 X: 11.2 ns
Bandwidth limit (5 MHz)	≥ -3 dB at 5 MHz
Overvoltage indicator light (red light)	Yes

Overvoltage alarm sound	Yes
Auto-save function	Yes
Auto-zero function	Yes
Bias voltage elimination function	Yes
Terminal load requirements	$\geq 100\text{ k}\Omega$
power supply	5 V, 2.4 A USB Power Adapter

Fig 1: Maximum differential mode voltage of GDP-2035H vs. Frequency



Mechanical Specifications

Type	Parameter
Differential Input Line	280 mm
Input Extension Cable	1000 mm
USB Cable (USB-A to USB-C)	1200 mm
Alligator Clip	85 mm × 40 mm × 17 mm
Pincer Clips	152 mm × 50 mm × 13 mm
Test Hook	121 mm × 37 mm × 20 mm
Banana Head Female Socket	∅ 4 mm × 31 mm × 5.5 mm
Probe Control Box Size	185 mm × 63 mm × 26 mm
Probe Output Terminal Size	83 mm × 31 mm × 22 mm
Probe Weight	335 g

Accessories Derating Table

Model	GDP-2035H
Alligator Clip	CAT III 1000 V
Pincer Clips	CAT III 1000 V
Test Hook	CAT III 1000 V
Input extension cable	CAT III 1000 V

Certificate of Compliance

We

GOOD WILL INSTRUMENT CO., LTD.

declare that the below mentioned product satisfies all the technical relations application to the product within the scope of council:

Directive: EMC; LVD; WEEE; RoHS

The product is in conformity with the following standards or other normative documents:

© EMC	
EN 61326-1 :	Electrical equipment for measurement, control and laboratory use – – EMC requirements
Conducted & Radiated Emission EN 55011 / EN 55032	Electrical Fast Transients EN 61000-4-4
Current Harmonics EN 61000-3-2 / EN 61000-3-12	Surge Immunity EN 61000-4-5
Voltage Fluctuations EN 61000-3-3 / EN 61000-3-11	Conducted Susceptibility EN 61000-4-6
Electrostatic Discharge EN 61000-4-2	Power Frequency Magnetic Field EN 61000-4-8
Radiated Immunity EN 61000-4-3	Voltage Dip/ Interruption EN 61000-4-11 / EN 61000-4-34
© Safety	
EN 61010-1 :	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements

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