

HIGH VOLTAGE DIFFERENTIAL PROBE

差動測試棒

CE

TR125 1400Vp-p/25MHz

TR150 7000Vp-p/50MHz

TR1100 7000Vp-p/100MHz

TR175 14KVp-p/75MHz

TR120 20KVp-p/20MHz

INSTRUCTION MANUAL

使用說明書

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● **Differential Voltage Probe,**

Read the instructions before using the instrument:

1. Must acquire a differential voltage probe & get the best service from instrument.
2. Read carefully the Instruction Manual.
3. Respect the safety precautions.

● **SAFETY PRECAUTIONS**

WARNING: Risk of Electric Shock,

1. Do not use the probe in damp environment or where there is risk of explosion.
2. Do not use the probe with its case open.
3. Disconnect the inputs and outputs of the probe before opening the case.
4. The probes are for indoor use only.

Respect the max input voltages:

TR125:

1. Max differential voltage: 1400V (DC + AC peak) or 450 Vrms
2. Max voltage between each input terminal and ground: 600 Vrms

TR150 & TR1100 :

1. Max differential voltage: 7000V (DC + AC peak) or 2200 Vrms
2. Max voltage between each input terminal and ground: 6500 Vrms

TR175

1. Max differential voltage: 14 KV (DC + AC peak) or 4900 Vrms
2. Max voltage between each input terminal and ground: 6500 Vrms

TR120

1. Max differential voltage: 20 KV (DC + AC peak) or 7000 Vrms
2. Max voltage between each input terminal and ground: 6500 Vrms

● **TO ORDER Differential Voltage Probe and Accessories:**

- An Insulated BNC/BNC lead, length 100cm.
- Supplied a Adapter preset 9 V DC (115 V or 230 V)
- 2 x high voltage IC clips
- 2 x Banana to Banana high voltage plug
- 2 x Alligator plug

TR125

High Voltage Differential Probe

TR125 HIGH VOLTAGE DIFFERENTIAL PROBE

1. FEATURES

- The TR125 differential probe provides a safety means for measuring differential voltage to all models of oscilloscopes.
- The TR125 converts the high differential voltage ($\leq 1400V_{\text{peak}}$) into a low voltage ($\leq 7.0V$, with reference to the earth) and display on the oscilloscopes.
- The TR125 is designed to operate with the $1M\Omega$ impedance oscilloscopes. When combine with the 50Ω load, the attenuation will be 2 times.
- We recommend to use Tronovo PL-10 with TR125 to expand the measuring with DMM to observe more accurate measurement. The accuracy of oscilloscope is 3% and the DMM is less than 1%.

NOTE: If you connect TR125 to the DMM without PL-10, the accuracy will be higher than 10%.

2. SPECIFICATIONS

(1) Bandwidth:

DC - to 25 MHz (-3 dB) for x 50, x 200

DC - to 15 MHz (for attenuation x 20)

(2) Attenuation: x 20, x 50, or x 200

(3) Accuracy: +/- 2%

(4) Voltage Input Ranges (DC + AC peak to peak)

$\leq 140 V_{\text{p-p}}$ for x 20, (i.e about 45 Vrms or DC)

$\leq 350 V_{\text{p-p}}$ for x 50, (i.e about 110 Vrms or DC)

$\leq 1400 V_{\text{p-p}}$ for x 200, (i.e about 450 Vrms or DC)

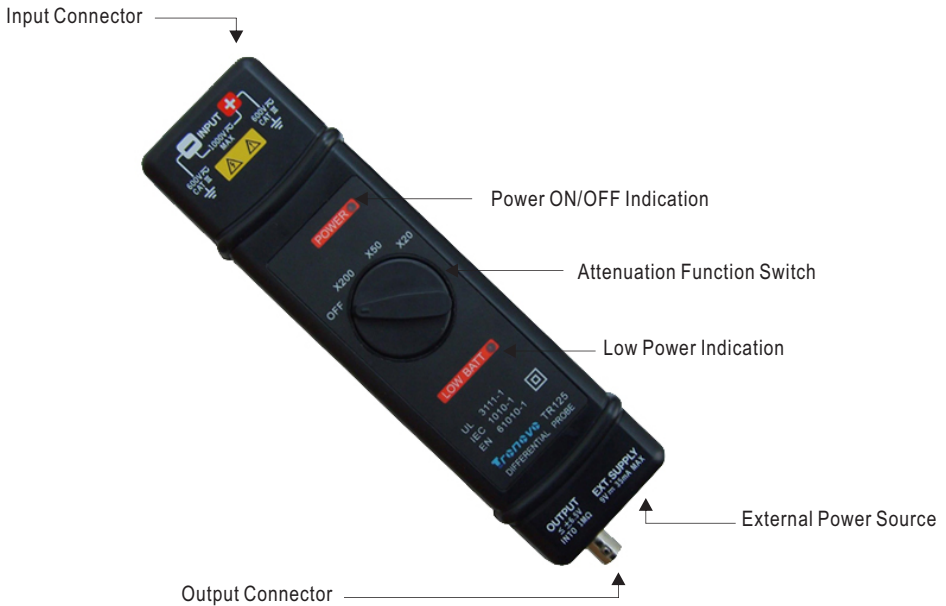
(5) Permitted Max Input Voltage

Max differential voltage: 1400 V (DC + AC peak to peak) or 450Vrms

Max voltage between each input terminal and ground:
600 Vrms

- (6) Input Impedance:
 Differential: $4\text{ M}\Omega / 1.2\text{ pF}$
 Between terminals and ground: $2\text{ M}\Omega / 2.3\text{ pF}$
- (7) Output: $\leq \pm 7.0\text{ V}$
- (8) Output Impedance: $50\ \Omega$
- (9) Rise Time: 14 ns for x 50, and x 200; 23.4 ns for x 20
- (10) Rejection Rate on Common Mode:
 $60\text{ Hz}: > 80\text{ dB}$; $100\text{ Hz}: > 60\text{ dB}$; $1\text{ MHz}: > 50\text{ dB}$
- (11) Power Supply: Only External 9 V DC power supply .
- (12) Consumption: 35 mA max (0.4 WATT)

3. PANEL DESCRIPTION



4. OPERATING ENVIRONMENTAL CONDITIONS

	Reference	Use	Storage
Temperature	+20°C ... +30°C	0°C ... +50°C	-30°C ... +70°C
Relative Humidity	≤ 70 % RH	10 % ... 85 % RH	10 % ... 90 % RH

(1) Dimensions and Weight:

195 x 55 x 30 mm; 250g

(2) Electrical Safety to IEC 1010-1

- Dual Insulation
- Installation Category III
- Degree of Pollution 2
- Rated Voltage or Max Line-Earth: 600 Vrms

(3) CE Mark

Conforms to EN 50081-1 and 50082-1 standards

(4) Indoor use only.

5. OPERATING PROCEDURE

- Connect the leads to the input and place the wire-grip on the circuit to be tested.
- Connect the probe to the oscilloscope with the insulated BNC/BNC lead.
- Adjust the vertical zero adjustment of the oscilloscope if necessary.
- Select the attenuation ratio* and the vertical deviation of the oscilloscope in accordance with the conversion table below.
- NB: The POWER light must come on.

The conversion table gives the real vertical deviation.

Attenuation	X 200	X 50	X 20
Voltage Input Range (DC+AC Peak)	1400Vp-p (±700VDC)	350Vp-p (±175VDC)	140Vp-p (±70VDC)

Vertical Deviation on the Oscilloscope in V/div	Real Deviation In V/div		
	x 200	x 50	x 20
1	200	50	20
0.5	100	25	10
0.2	40	10	4
0.1	20	5	2
50 m	10	2.5	1
20 m	4	1	0.4
10 m	2	0.5	0.2
5 m	1	0.25	0.1
2 m	0.4	0.1	40 m

[N.B]

The real vertical deviation in V/div is equal to the attenuation factor multiplied by the range of vertical deviation selected on the oscilloscope. It will be doubled in the case of use of a 50 Ω load.

Example:

With the probe on factor x 200, the oscilloscope on 0.5 V/div, the real vertical deviation is $200 \times 0.5 = 100$ V/div.

With a 50 Ω load on the input of the oscilloscope the deviation becomes 200 V/div.

6. MAINTENANCE

For maintenance, only use specified spare parts.

The manufacturer can not be held responsible for any accident arising following a repair made other than its after sales service or approved repairers.

7. CLEANING

This probe does not require any particular cleaning. If necessary, clean the case with a cloth slightly moistened with soapy water.

8. STORAGE

If the probe is not use more than 60 days, please store the probe in a dehumidified environment to keep dry.

9. WARRANTY

Unless notified to the contrary, our instruments are guaranteed against any manufacturing defect or material defect. They do not bear the specification known as the safety specification. Our guarantee, which may not under any circumstances exceed the amount of the invoiced price, goes no further than the repair of our faulty equipment, carriage paid to our workshops.

It is applicable for normal use of our instruments, and does not apply to damage or destruction caused, notably by error in mounting, mechanical accident, faulty maintenance, defective use, overload or exceed voltage.

Our responsibility being strictly limited to the pure and simple replacement of the faculty parts of our equipment, the buyer expressly renounces any attempt to find us responsible for damages or losses caused directly or indirectly.

Our guarantee is applicable for twelve (12) months after the date at which the equipment is made available. The repair, modification or replacement of a part during the guarantee period will not result in this guarantee being extended.

10. REPAIR

Maintenance, repairs under or out of guarantee. Please return the product to your distributor.

11. ACCESSORIES

- ADP-110V or ADP-220V: AC Adapter.
- BP-250: BNC Plug to BNC Plug; 50 Ω Resistance , RG58C UL, Length 100cm.
- BP-356N: Banana Plug to Banana Plug Silicon Wire; UL 6KV, 18AWG, Length 60cm.(Red x 1pc , Black x 1pc)
- BP-256N: IC Clip, UL 1000V CAT III.(Red x 1pc , Black x 1pc)
- BP-276N: Alligator Clip, UL 1000V CAT II, 10A.(Red x 1pc , Black x 1pc)
- Instruction Manual(TINSE0004S4).

TR150

High Voltage Differential Probe

TR150 HIGH VOLTAGE DIFFERENTIAL PROBE

1. FEATURES

- The TR150 differential probe provides a safety means for measuring differential voltage to all models of oscilloscopes.
- The TR150 converts the high differential voltage ($\leq 7000V_{\text{peak}}$) into a low voltage ($\leq 7.0V$, with reference to the earth) and display on the oscilloscopes.
- The TR150 is designed to operate with the $1M\Omega$ impedance oscilloscopes. When combine with the 50Ω load, the attenuation will be 2 times.
- We recommend to use Tronovo PL-10 with TR150 to expand the measuring with DMM to observe more accurate measurement. The accuracy of oscilloscope is 3% and the DMM is less than 1%.

NOTE: If you connect TR150 to the DMM without PL-10, the accuracy will be higher than 10%.

2. SPECIFICATIONS

(1) Bandwidth:

DC - to 50 MHz (-3 dB) for x 200, x 500 and x 1000

DC - to 25 MHz (for attenuation x 100)

(2) Attenuation: x 100, x 200, x 500, x1000

(3) Accuracy: +/- 2%

(4) Voltage Input Ranges (DC + AC peak to peak)

$\leq 700 V_{\text{p-p}}$ for x 100, (i.e about 230 Vrms or DC)

$\leq 1400 V_{\text{p-p}}$ for x 200, (i.e about 460 Vrms or DC)

$\leq 3500 V_{\text{p-p}}$ for x 500, (i.e about 1140 Vrms or DC)

$\leq 7000 V_{\text{p-p}}$ for x 1000, (i.e about 2300 Vrms or DC)

(5) Permitted Max Input Voltage

Max differential voltage: 7000 V (DC + AC peak to peak)

Max voltage between each input terminal and ground:

6500 Vrms

(6) Input Impedance:

Differential: $54\text{ M}\Omega / 1.2\text{ pF}$

Between terminals and ground: $27\text{ M}\Omega / 2.3\text{ pF}$

(7) Output: $\leq \pm 7.0\text{ V}$

(8) Output Impedance: $50\ \Omega$

(9) Rise Time: 7 ns for x 200, x 500, and x 1000; 14 ns for x 100

(10) Rejection Rate on Common Mode:

60 Hz : $> 80\text{ dB}$; 100 Hz : $> 60\text{ dB}$; 1 MHz : $> 50\text{ dB}$

(11) Power Supply: Only External 9 V DC power supply .

(12) Consumption: 35 mA max (0.4 WATT)

3. PANEL DESCRIPTION



4. OPERATING ENVIRONMENTAL CONDITIONS

	Reference	Use	Storage
Temperature	+20°C ... +30°C	0°C ... +50°C	-30°C ... +70°C
Relative Humidity	≤ 70 % RH	10 % ... 85 % RH	10 % ... 90 % RH

(1) Dimensions and Weight:

240 x 80 x 30 mm; 280g

(2) Electrical Safety to IEC 1010-1

- Dual Insulation
- Installation Category III
- Degree of Pollution 2
- Rated Voltage or Max Line-Earth: 6500 Vrms

(3) CE Mark

Conforms to EN 50081-1 and 50082-1 standards

(4) Indoor use only.

5. OPERATING PROCEDURE

- Connect the leads to the input and place the wire-grip on the circuit to be tested.
- Connect the probe to the oscilloscope with the insulated BNC/BNC lead.
- Adjust the vertical zero adjustment of the oscilloscope if necessary.
- Select the attenuation ratio* and the vertical deviation of the oscilloscope in accordance with the conversion table below.
- NB: The POWER light must come on.

The conversion table gives the real vertical deviation.

Attenuation	X 1000	X 500	X 200	X 100
Voltage Input Range (DC+AC Peak)	7000Vp-p (±3500VDC)	3500Vp-p (±1750VDC)	1400Vp-p (±700VDC)	700Vp-p (±350VDC)

Vertical Deviation on the Oscilloscope in V/div	Real Deviation In V/div			
	x 1000	x 500	x 200	x 100
1	1000	500	200	100
0.5	500	250	100	50
0.2	200	100	40	20
0.1	100	50	2	10
50 m	50	25	10	5
20 m	20	10	4	2
10 m	10	5	2	1
5 m	5	2.5	1	0.5
2 m	2	1	0.4	0.2

[N.B]

The real vertical deviation in V/div is equal to the attenuation factor multiplied by the range of vertical deviation selected on the oscilloscope. It will be doubled in the case of use of a 50 Ω load.

Example:

With the probe on factor x 200, the oscilloscope on 0.5 V/div, the real vertical deviation is $200 \times 0.5 = 100$ V/div.

With a 50 Ω load on the input of the oscilloscope the deviation becomes 200 V/div.

6. MAINTENANCE

For maintenance, only use specified spare parts.

The manufacturer can not be held responsible for any accident arising following a repair made other than its after sales service or approved repairers.

7. CLEANING

This probe does not require any particular cleaning. If necessary, clean the case with a cloth slightly moistened with soapy water.

8. STORAGE

If the probe is not use more than 60 days, please store the probe in a dehumidified environment to keep dry.

9. WARRANTY

Unless notified to the contrary, our instruments are guaranteed against any manufacturing defect or material defect. They do not bear the specification known as the safety specification. Our guarantee, which may not under any circumstances exceed the amount of the invoiced price, goes no further than the repair of our faulty equipment, carriage paid to our workshops.

It is applicable for normal use of our instruments, and does not apply to damage or destruction caused, notably by error in mounting, mechanical accident, faulty maintenance, defective use, overload or exceed voltage.

Our responsibility being strictly limited to the pure and simple replacement of the faculty parts of our equipment, the buyer expressly renounces any attempt to find us responsible for damages or losses caused directly or indirectly.

Our guarantee is applicable for twelve (12) months after the date at which the equipment is made available. The repair, modification or replacement of a part during the guarantee period will not result in this guarantee being extended.

10. REPAIR

Maintenance, repairs under or out of guarantee. Please return the product to your distributor.

11. ACCESSORIES

- ADP-110V or ADP-220V: AC Adapter.
- BP-250: BNC Plug to BNC Plug; 50 Ω Resistance, RG58C UL, Length 100cm.
- BP-276N: Alligator Clip, UL 1000V CAT II, 10A.
(Red x 1pc , Black x 1pc)
- BP-266: HV IC Clip, MAX. 6500V(DC+ACp-p).
(Red x 1pc , Black x 1pc)
- BP-366: HV Banana Plug to Banana Plug Silicon Wire, 18AWG, UL 20KV, Length 60cm.(Red x 1pc , Black x 1pc)
- Instruction Manual(TINSE0004S4).

TR1100

High Voltage Differential Probe

TR1100 HIGH VOLTAGE DIFFERENTIAL PROBE

1. FEATURES

- The TR1100 differential probe provides a safety means for measuring differential voltage to all models of oscilloscopes.
- The TR1100 converts the high differential voltage ($\leq 7000V_{\text{peak}}$) into a low voltage ($\leq 7.0V$, with reference to the earth) and display on the oscilloscopes.
- The TR1100 is designed to operate with the $1M\Omega$ impedance oscilloscopes. When combine with the 50Ω load, the attenuation will be 2 times.
- We recommend to use Tronovo PL-10 with TR1100 to expand the measuring with DMM to observe more accurate measurement. The accuracy of oscilloscope is 3% and the DMM is less than 1%.

NOTE: If you connect TR1100 to the DMM without PL-10, the accuracy will be higher than 10%.

2. SPECIFICATIONS

(1) Bandwidth:

DC - to 100 MHz (-3 dB) for x 200, x 500 and x 1000

DC - to 50 MHz (for attenuation x 100)

(2) Attenuation: x 100, x 200, x 500, x1000

(3) Accuracy: +/- 2%

(4) Voltage Input Ranges (DC + AC peak to peak)

$\leq 700 V_{p-p}$ for x 100, (i.e about 230 Vrms or DC)

$\leq 1400 V_{p-p}$ for x 200, (i.e about 460 Vrms or DC)

$\leq 3500 V_{p-p}$ for x 500, (i.e about 1140 Vrms or DC)

$\leq 7000 V_{p-p}$ for x 1000, (i.e about 2300 Vrms or DC)

(5) Permitted Max Input Voltage

Max differential voltage: 7000 V (DC + AC peak to peak)

Max voltage between each input terminal and ground:

6500 Vrms

(6) Input Impedance:

Differential: $54 \text{ M}\Omega / 1.2 \text{ pF}$

Between terminals and ground: $27 \text{ M}\Omega / 2.3 \text{ pF}$

(7) Output: $\leq \pm 7.0 \text{ V}$

(8) Output Impedance: 50Ω

(9) Rise Time: 3.5 ns for x 200, x 500, and x 1000; 7 ns for x 100

(10) Rejection Rate on Common Mode:

$60 \text{ Hz}: > 80 \text{ dB}$; $100 \text{ Hz}: > 60 \text{ dB}$; $1 \text{ MHz}: > 50 \text{ dB}$

(11) Power Supply: Only External 9 V DC power supply .

(12) Consumption: 35 mA max (0.4 WATT)

3. PANEL DESCRIPTION



4. OPERATING ENVIRONMENTAL CONDITIONS

	Reference	Use	Storage
Temperature	+20°C ... +30°C	0°C ... +50°C	-30°C ... +70°C
Relative Humidity	≤ 70 % RH	10 % ... 85 % RH	10 % ... 90 % RH

(1) Dimensions and Weight:

240 x 80 x 30 mm; 280g

(2) Electrical Safety to IEC 1010-1

- Dual Insulation
- Installation Category III
- Degree of Pollution 2
- Rated Voltage or Max Line-Earth: 6500 Vrms

(3) CE Mark

Conforms to EN 50081-1 and 50082-1 standards

(4) Indoor use only.

5. OPERATING PROCEDURE

- Connect the leads to the input and place the wire-grip on the circuit to be tested.
- Connect the probe to the oscilloscope with the insulated BNC/BNC lead.
- Adjust the vertical zero adjustment of the oscilloscope if necessary.
- Select the attenuation ratio* and the vertical deviation of the oscilloscope in accordance with the conversion table below.
- NB: The POWER light must come on.

The conversion table gives the real vertical deviation.

Attenuation	X 1000	X 500	X 200	X 100
Voltage Input Range (DC+AC Peak)	7000Vp-p (±3500VDC)	3500Vp-p (±1750VDC)	1400Vp-p (±700VDC)	700Vp-p (±350VDC)

Vertical Deviation on the Oscilloscope in V/div	Real Deviation In V/div			
	x 1000	x 500	x 200	x 100
1	1000	500	200	100
0.5	500	250	100	50
0.2	200	100	40	20
0.1	100	50	2	10
50 m	50	25	10	5
20 m	20	10	4	2
10 m	10	5	2	1
5 m	5	2.5	1	0.5
2 m	2	1	0.4	0.2

[N.B]

The real vertical deviation in V/div is equal to the attenuation factor multiplied by the range of vertical deviation selected on the oscilloscope. It will be doubled in the case of use of a 50 Ω load.

Example:

With the probe on factor x 200, the oscilloscope on 0.5 V/div, the real vertical deviation is $200 \times 0.5 = 100$ V/div.

With a 50 Ω load on the input of the oscilloscope the deviation becomes 200 V/div.

6. MAINTENANCE

For maintenance, only use specified spare parts.

The manufacturer can not be held responsible for any accident arising following a repair made other than its after sales service or approved repairers.

7. CLEANING

This probe does not require any particular cleaning. If necessary, clean the case with a cloth slightly moistened with soapy water.

8. STORAGE

If the probe is not use more than 60 days, please store the probe in a dehumidified environment to keep dry.

9. WARRANTY

Unless notified to the contrary, our instruments are guaranteed against any manufacturing defect or material defect. They do not bear the specification known as the safety specification. Our guarantee, which may not under any circumstances exceed the amount of the invoiced price, goes no further than the repair of our faulty equipment, carriage paid to our workshops.

It is applicable for normal use of our instruments, and does not apply to damage or destruction caused, notably by error in mounting, mechanical accident, faulty maintenance, defective use, overload or exceed voltage.

Our responsibility being strictly limited to the pure and simple replacement of the faculty parts of our equipment, the buyer expressly renounces any attempt to find us responsible for damages or losses caused directly or indirectly.

Our guarantee is applicable for twelve (12) months after the date at which the equipment is made available. The repair, modification or replacement of a part during the guarantee period will not result in this guarantee being extended.

10. REPAIR

Maintenance, repairs under or out of guarantee. Please return the product to your distributor.

11. ACCESSORIES

- ADP-110V or ADP-220V: AC Adapter.
- BP-250: BNC Plug to BNC Plug; 50 Ω Resistance, RG58C UL, Length 100cm.
- BP-276N: Alligator Clip, UL 1000V CAT II, 10A.
(Red x 1pc , Black x 1pc)
- BP-286: Test Lead UL 1000V, CAT III.(Red x 1pc , Black x 1pc)
- BP-266: HV IC Clip, MAX. 6500V(DC+ACp-p).
(Red x 1pc , Black x 1pc)
- BP-366: HV Banana Plug to Banana Plug Silicon Wire, 18AWG, UL 20KV, Length 60cm.(Red x 1pc , Black x 1pc)
- Carry Case(PX-502).
- Instruction Manual(TINSE0004S4).

TR175

High Voltage Differential Probe

TR175 HIGH VOLTAGE DIFFERENTIAL PROBE —————

1. FEATURES

- The TR175 differential probe provides a safety means for measuring differential voltage to all models of oscilloscopes.
- The TR175 converts the high differential voltage ($\leq 14\text{KV}_{\text{peak}}$) into a low voltage ($\leq 7.0\text{V}$, with reference to the earth) and display on the oscilloscopes. Its $75\text{MHz}/14\text{KV}_{\text{peak}}$ is very suitable for high frequency users and high voltage testing conditions R+D people and repairs.

The TR175 is designed to operate with the $1\text{M}\Omega$ impedance oscilloscopes. When combine with the 50Ω load, the attenuation

- will be 2 times.

We recommend to use Tronovo PL-10 with TR175 to expand the measuring with DMM to observe more accurate measurement. The accuracy of oscilloscope is 3% and the DMM is less than 1%.

NOTE: If you connect TR175 to the DMM without PL-10, the accuracy will be higher than 10%.

2. SPECIFICATIONS

(1) Bandwidth:

DC - to 75 MHz (-3 dB)

DC - to 35 MHz (for attenuation x 200)

(2) Attenuation: x 100, x 400, x 1000, x 2000

(3) Accuracy: +/- 2%

(4) Voltage Input Ranges (DC + AC peak to peak)

$\leq 1400\text{ Vp-p}$ for x 200, (i.e about 460 Vrms or DC)

$\leq 2800\text{ Vp-p}$ for x 400, (i.e about 920 Vrms or DC)

$\leq 7000\text{ Vp-p}$ for x 1000, (i.e about 2320 Vrms or DC)

$\leq 14000\text{ Vp-p}$ for x 2000, (i.e about 4950 Vrms or DC)

(5) Permitted Max Input Voltage

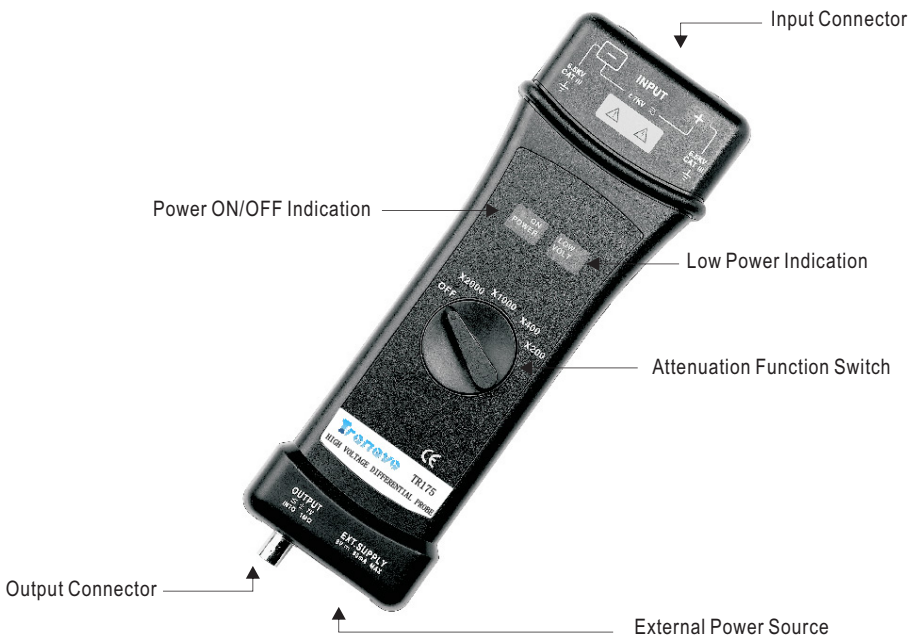
Max differential voltage: 14KV (DC + AC peak to peak)

Max voltage between each input terminal and ground:



- (6) Input Impedance:
 Differential: $54\text{ M}\Omega / 1.2\text{ pF}$
 Between terminals and ground: $27\text{ M}\Omega / 2.3\text{ pF}$
- (7) Output: $\leq \pm 7.0\text{ V}$
- (8) Output Impedance: $50\ \Omega$
- (9) Rise Time: 4.7 ns for x 400, x 1000, and x 2000; 10 ns for x 200
- (10) Rejection Rate on Common Mode:
 60 Hz: $> 80\text{ dB}$; 100 Hz: $> 60\text{ dB}$; 1 MHz: $> 50\text{ dB}$
- (11) Power Supply:
 Only External 9 V DC power supply .
- (12) Consumption: 35 mA max (0.4 WATT)

3. PANEL DESCRIPTION



4. OPERATING ENVIRONMENTAL CONDITIONS

	Reference	Use	Storage
Temperature	+20°C ... +30°C	0°C ... +50°C	-30°C ... +70°C
Relative Humidity	≤ 70 % RH	10 % ... 85 % RH	10 % ... 90 % RH

(1) Dimensions and Weight:

240 x 80 x 30 mm; 280g

(2) Electrical Safety to IEC 1010-1

- Dual Insulation
- Installation Category III
- Degree of Pollution 2
- Rated Voltage or Max Line-Earth: 6.5 KVrms

(3) CE Mark

Conforms to EN 50081-1 and 50082-1 standards

(4) Indoor use only.

5. OPERATING PROCEDURE

- Connect the leads to the input and place the wire-grip on the circuit to be tested.
- Connect the probe to the oscilloscope with the insulated BNC/BNC lead.
- Adjust the vertical zero adjustment of the oscilloscope if necessary.
- Select the attenuation ratio* and the vertical deviation of the oscilloscope in accordance with the conversion table below.
- NB: The POWER light must come on.

The conversion table gives the real vertical deviation.

Attenuation	X 2000	X 1000	X 400	X 200
Voltage Input Range (DC+AC Peak)	14000Vp-p (±7000VDC)	7000Vp-p (±3500VDC)	2800Vp-p (±1400VDC)	1400Vp-p (±700VDC)

Vertical Deviation on the Oscilloscope in V/div	Real Deviation In V/div			
	x 2000	x 1000	x 400	x 200
1	2000	1000	400	200
0.5	100	500	200	10
0.2	400	200	80	40
0.1	200	100	40	20
50 m	100	50	20	10
20 m	40	20	8	4
10 m	20	10	4	2
5 m	10	5	2	1
2 m	4	2	0.8	0.4

[N.B]

The real vertical deviation in V/div is equal to the attenuation factor multiplied by the range of vertical deviation selected on the oscilloscope. It will be doubled in the case of use of a 50 Ω load.

Example:

With the probe on factor x 200, the oscilloscope on 0.5 V/div, the real vertical deviation is $200 \times 0.5 = 100$ V/div.

With a 50 Ω load on the input of the oscilloscope the deviation becomes 200 V/div.

6. MAINTENANCE

For maintenance, only use specified spare parts.

The manufacturer can not be held responsible for any accident arising following a repair made other than its after sales service or approved repairers.

7. CLEANING

This probe does not require any particular cleaning. If necessary, clean the case with a cloth slightly moistened with soapy water.

8. STORAGE

If the probe is not use more than 60 days, please store the probe in a dehumidified environment to keep dry.

9. WARRANTY

Unless notified to the contrary, our instruments are guaranteed against any manufacturing defect or material defect. They do not bear the specification known as the safety specification. Our guarantee, which may not under any circumstances exceed the amount of the invoiced price, goes no further than the repair of our faulty equipment, carriage paid to our workshops.

It is applicable for normal use of our instruments, and does not apply to damage or destruction caused, notably by error in mounting, mechanical accident, faulty maintenance, defective use, overload or exceed voltage.

Our responsibility being strictly limited to the pure and simple replacement of the faculty parts of our equipment, the buyer expressly renounces any attempt to find us responsible for damages or losses caused directly or indirectly.

Our guarantee is applicable for twelve (12) months after the date at which the equipment is made available. The repair, modification or replacement of a part during the guarantee period will not result in this guarantee being extended.

10. REPAIR

Maintenance, repairs under or out of guarantee. Please return to product to your distributor.

11. ACCESSORIES

- ADP-110V or ADP-220V: AC Adapter.
- BP-250: BNC Plug to BNC Plug; 50 Ω Resistance, RG58C UL, Length 100cm.
- BP-276N: Alligator Clip, UL 1000V CAT II, 10A.
(Red x 1pc , Black x 1pc)
- BP-286: Test Lead UL 1000V, CAT III.(Red x 1pc , Black x 1pc)
- BP-266: HV IC Clip, MAX. 6500V(DC+ACp-p).
(Red x 1pc , Black x 1pc)
- BP-366: HV Banana Plug to Banana Plug Silicon Wire, 18AWG, UL 20KV, Length 60cm.(Red x 1pc , Black x 1pc)
- Carry Case(PX-502).
- Instruction Manual(TINSE0004S4).

TR120

High Voltage Differential Probe

TR120 HIGH VOLTAGE DIFFERENTIAL PROBE —————

1. FEATURES

- The TR120 differential probe provides a safety means for measuring differential voltage to all models of oscilloscopes.
- The TR120 converts the high differential voltage ($\leq 20\text{KV}_{\text{peak}}$) into a low voltage ($\leq 7.0\text{V}$, with reference to the earth) and display on the oscilloscopes. Its $20\text{MHz}/20\text{KV}_{\text{peak}}$ is very suitable for high frequency users and high voltage testing conditions R+D
- people and repairs.

The TR120 is designed to operate with the $1\text{M}\Omega$ impedance oscilloscopes. When combine with the 50Ω load, the attenuation

- will be 2 times.

We recommend to use Tronovo PL-10 with TR120 to expand the measuring with DMM to observe more accurate measurement. The accuracy of oscilloscope is 3% and the DMM is less than 1%.

NOTE: If you connect TR120 to the DMM without PL-10, the accuracy will be higher than 10%.

2. SPECIFICATIONS

(1) Bandwidth:

DC - to 20 MHz (-3 dB)

DC - to 10 MHz (for attenuation x 300)

(2) Attenuation: x 300, x 600, x 1500, x 3000

(3) Accuracy: +/- 2%

(4) Voltage Input Ranges (DC + AC peak to peak)

$\leq 2000\text{ V}$ for x 300, (i.e about 700 Vrms or DC)

$\leq 4000\text{ V}$ for x 600, (i.e about 1400 Vrms or DC)

$\leq 10000\text{ V}$ for x 1500, (i.e about 3400 Vrms or DC)

$\leq 20000\text{ V}$ for x 3000, (i.e about 7000 Vrms or DC)

(5) Permitted Max Input Voltage

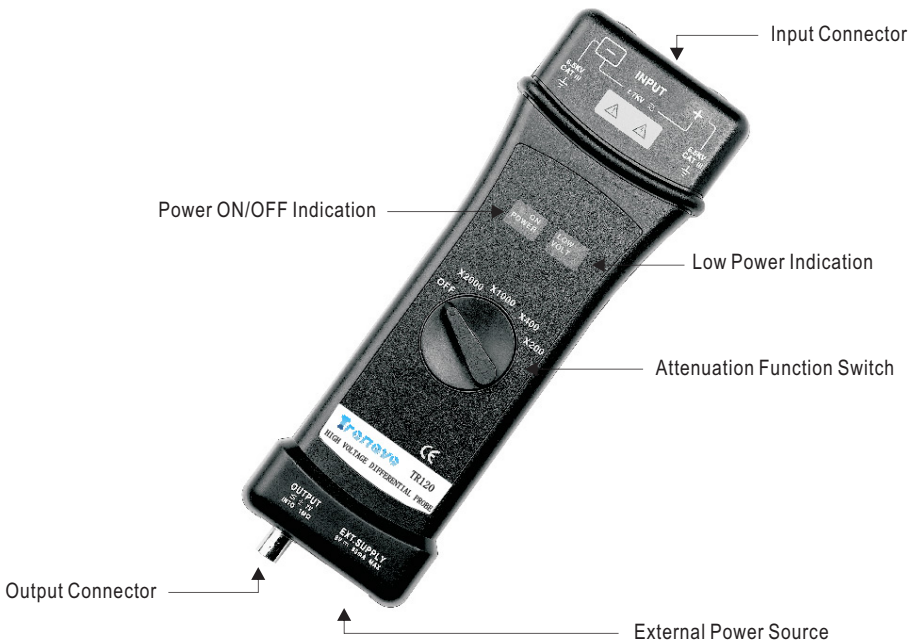
Max differential voltage: 20KV (DC + AC peak to peak)

Max voltage between each input terminal and ground:

6500 Vrms

- (6) Input Impedance:
 Differential: $118\text{ M}\Omega / 1.2\text{ pF}$
 Between terminals and ground: $59\text{ M}\Omega / 2.3\text{ pF}$
- (7) Output: $\leq \pm 7.0\text{ V}$
- (8) Output Impedance: $50\ \Omega$
- (9) Rise Time: 17.5 ns for x 600, x 1500, and x 3000;
 35 ns for x 300
- (10) Rejection Rate on Common Mode:
 $60\text{ Hz}: > 80\text{ dB}$; $100\text{ Hz}: > 60\text{ dB}$; $1\text{ MHz}: > 50\text{ dB}$
- (11) Power Supply:
 Only External 9 V DC power supply .
- (12) Consumption: 35 mA max (0.4 WATT)

3. PANEL DESCRIPTION



4. OPERATING ENVIRONMENTAL CONDITIONS

	Reference	Use	Storage
Temperature	+20°C ... +30°C	0°C ... +50°C	-30°C ... +70°C
Relative Humidity	≤ 70 % RH	10 % ... 85 % RH	10 % ... 90 % RH

(1) Dimensions and Weight:

240 x 80 x 30 mm; 280g

(2) Electrical Safety to IEC 1010-1

- Dual Insulation
- Installation Category III
- Degree of Pollution 2
- Rated Voltage or Max Line-Earth: 6.5 KVrms

(3) CE Mark

Conforms to EN 50081-1 and 50082-1 standards

(4) Indoor use only.

5. OPERATING PROCEDURE

- Connect the leads to the input and place the wire-grip on the circuit to be tested.
- Connect the probe to the oscilloscope with the insulated BNC/BNC lead.
- Adjust the vertical zero adjustment of the oscilloscope if necessary.
- Select the attenuation ratio* and the vertical deviation of the oscilloscope in accordance with the conversion table below.
- NB: The POWER light must come on.

The conversion table gives the real vertical deviation.

Attenuation	X 3000	X 1500	X 600	X 300
Voltage Input Range (DC+AC Peak)	20KVp-p (±10KVDC)	10KVp-p (±5KVDC)	4KVp-p (±2KVDC)	2KVp-p (±1KVDC)

Vertical Deviation on the Oscilloscope in V/div	Real Deviation In V/div			
	x 3000	x 1500	x 600	x 300
1	3000	1500	600	300
0.5	1500	750	300	150
0.2	600	300	120	60
0.1	300	150	60	30
50 m	150	75	30	15
20 m	60	30	12	6
10 m	30	15	6	3
5 m	15	7.5	3	1.5
2 m	6	3	1.2	0.6

[N.B]

The real vertical deviation in V/div is equal to the attenuation factor multiplied by the range of vertical deviation selected on the oscilloscope. It will be doubled in the case of use of a 50 Ω load.

Example:

With the probe on factor x 200, the oscilloscope on 0.5 V/div, the real vertical deviation is $200 \times 0.5 = 100$ V/div.

With a 50 Ω load on the input of the oscilloscope the deviation becomes 200 V/div.

6. MAINTENANCE

For maintenance, only use specified spare parts.

The manufacturer can not be held responsible for any accident arising following a repair made other than its after sales service or approved repairers.

7. CLEANING

This probe does not require any particular cleaning. If necessary, clean the case with a cloth slightly moistened with soapy water.

8. STORAGE

If the probe is not use more than 60 days, please store the probe in a dehumidified environment to keep dry.

9. WARRANTY

Unless notified to the contrary, our instruments are guaranteed against any manufacturing defect or material defect. They do not bear the specification known as the safety specification. Our guarantee, which may not under any circumstances exceed the amount of the invoiced price, goes no further than the repair of our faulty equipment, carriage paid to our workshops.

It is applicable for normal use of our instruments, and does not apply to damage or destruction caused, notably by error in mounting, mechanical accident, faulty maintenance, defective use, overload or exceed voltage.

Our responsibility being strictly limited to the pure and simple replacement of the faculty parts of our equipment, the buyer expressly renounces any attempt to find us responsible for damages or losses caused directly or indirectly.

Our guarantee is applicable for twelve (12) months after the date at which the equipment is made available. The repair, modification or replacement of a part during the guarantee period will not result in this guarantee being extended.

10. REPAIR

Maintenance, repairs under or out of guarantee. Please return to product to your distributor.

11. ACCESSORIES

- ADP-110V or ADP-220V: AC Adapter.
- BP-250: BNC Plug to BNC Plug; 50 Ω Resistance, RG58C UL, Length 100cm.
- BP-276N: Alligator Clip, UL 1000V CAT II, 10A.
(Red x 1pc , Black x 1pc)
- BP-286: Test Lead UL 1000V, CAT III.(Red x 1pc , Black x 1pc)
- BP-266: HV IC Clip, MAX. 6500V(DC+ACp-p).
(Red x 1pc , Black x 1pc)
- BP-366: HV Banana Plug to Banana Plug Silicon Wire, 18AWG, UL 20KV, Length 60cm.(Red x 1pc , Black x 1pc)
- Carry Case(PX-502).
- Instruction Manual(TINSE0004S4).

差動測試棒，

● 使用前請詳細閱讀使用說明

1. 請先獲得一支差動測試棒。
2. 從使用說明取得最佳維修及服務。
3. 請詳讀使用說明書。
4. 請注意安全注意事項。

● 安全注意事項：

請小心注意觸電!

請注意最高輸入電壓!

TR125：

最高差動電壓: 1400 V (DC + AC peak) 或450 Vrms

輸入端及接地端間的最大差動電壓: 600Vrms

TR150 及 TR1100：

最高差動電壓: 7000 V (DC + AC peak) 或2200 Vrms

輸入端及接地端間的最大差動電壓: 6500 Vrms

TR175：

最高差動電壓: 14 KV (DC + AC peak) 或4900 Vrms

輸入端及接地端間的最大差動電壓: 6500 Vrms

TR120：

最高差動電壓: 20 KV (DC + AC peak) 或7000 Vrms

輸入端及接地端間的最大差動電壓: 6500 Vrms

請勿使用此產品在潮濕的環境下或有易爆的風險下操作!

請勿使用此產品當此產品的盒蓋被打開!

當打開此產品的盒蓋時請將輸出及輸入端切斷!

● 訂購差動測試棒時內含

- 雙端BNC接頭的測試纜線,長度1公尺(BP-250)
- 一個9 V DC 轉換器 (客戶必需指定115 V或230 V)
- 一對高電壓專用的IC夾(BP-256N 或 BP-266)
- 一對指定規格的雙端香蕉插頭高電壓傳輸線(BP-356V 或 BP-366)
- 一對高電壓專用的鱷魚夾

TR125

差 動 測 試 棒

TR125 差動測試棒

1. 簡述:

- TR125差動測試棒提供一個安全的儀器給所有的示波器使用, 它可以轉換由高輸入的差動電壓(≤ 1400 PEAK) 進入一個低電壓($\leq 7.0V$), 並且顯示波形在示波器上, 使用頻率高達25 MHz.非常適合大電力測試、研發使用。
- 差動測試棒輸出標示是設計在操作示波器 $1M\Omega$ 的輸入阻抗的相對衰減量, 當使用 50Ω 匹配器時衰減量剛好為2倍量。
- TR125差動測試棒, 也建議選購本公司生產的PL-10阻抗轉換器, 可以延伸差動測試棒的應用範圍-可以在數字電錶上觀測更精確的實際測試電壓值(示波器精確度為3%, 數字電錶約精準3倍)。
(注意) 如果沒有使用PL-10阻抗轉換器, 而直接連接數字電錶, 讀值的誤差將大於10%。

2. 規格:

- (1) 頻寬: DC - 25 MHz (-3dB) for x 50, x 200
DC - 15 MHz (衰減 x 20檔)
- (2) 衰減: x 20, x 50, 或 x 200
- (3) 精確度: +/- 2%
- (4) 輸入電壓範圍 (DC + AC PEAK TO PEAK)
 - ≤ 140 Vp-p for x 20, (約45V RMS 或DC)
 - ≤ 350 Vp-p for x 50, (約110 V RMS 或DC)
 - ≤ 1400 Vp-p for x 200, (約450 V RMS 或DC)
- (5) 允許最高輸入電壓:
最高差動電壓: 1400 V (DC + AC PEAK TO PEAK) 或 450Vrms
輸入端及接地端間最高電壓: 600 Vrms
- (6) 輸入阻抗:
差動: $4 M\Omega / 1.2 pF$
單端到接地端間的輸入阻抗: $2 M\Omega / 2.3 pF$
- (7) 輸出電壓: $\leq +/- 7.0 V$

- (8) 輸出阻抗: $50\ \Omega$
- (9) 上升時間:
 14 ns for x 50 及 x 200
 23.4 ns for x 20
- (10) 雜訊抑制率:
 60 Hz: > 80 dB ; 100 Hz: > 60 dB ; 1 MHz: > 50 dB
- (11) 電源:
 指定外接9 V DC 電源(必須是本公司承認指定品)
- (12) 耗電: 最大耗電量35 mA (0.4瓦特)

3. 測試棒面板說明



4. 操作環境及狀況

	一般狀態	使用操作中	儲存
溫度	+20°C ... +30°C	0°C ... +50°C	-30°C ... +70°C
溼度	≤70 % RH	10 % ... 85 % RH	10 % ... 90 % RH

(1) 尺寸及重量: 195 x 55 x 30 mm; 250g

(2) 電子安全規範 **IEC 1010-1**

- 雙絕緣
- 安裝類目 III
- 污染程度 2
- 相關電壓或最大接地: 600 Vrms
- CE: EN50081-1 及 50082-1

(3) 請使用於室內環境。

5. 操作程序

- 將附件BP-356 與 BP-256N (或BP-276) 接起來後插入TR125 的輸入端, 並將BP-256N (或BP-276) 與測量物接觸。
- 將BP-250與TR125的輸出端連接, 並與示波器連結。
- 如有需要先調整示波器上的垂直開關。
- 將示波器上的衰減率及垂直開關調整到一致的位置, 如下表。
- 注意: 電源必須打開。

衰減	X 200	X 50	X 20
最大輸入電壓 (DC+AC Peak)	1400Vp-p (±700VDC)	350Vp-p (±175VDC)	140Vp-p (±70VDC)

示波器上的 垂直偏向(V/DIV)	實 際 偏 向(V/DIV)		
	x 200	x 50	x 20
1	200	50	20
0.5	100	25	10
0.2	40	10	4
0.1	20	5	2
50 m	10	2.5	1
20 m	4	1	0.4
10 m	2	0.5	0.2
5 m	1	0.25	0.1
2 m	0.4	0.1	40 m

〔注意〕

實際的垂直偏向是等於衰減乘上示波器上所選擇的垂直偏向。如果是使用PL-50(50 Ω 負載器)時, 實際偏向值 x2 (等於2倍量)。

例如:

測試棒是 x 200, 示波器的垂直偏向在 0.5, 其實際的垂直偏向為:
 $200 \times 0.5 = 100 \text{ V/div}$

示波器輸入的負載是50 Ω , 偏向就為200 V/div

6. 維護:

保養此產品時請使用原廠指定的工具. 原廠將不負任何責任由其他不被認可的維修人員所做的維修。

本產品如超過60天不使用, 請將本產品至於防潮箱存放。

7. 清潔：

此產品不需要任何特定的清潔。如有需要，請用輕軟乾淨的布沾上微量的清潔液輕輕的在產品外觀擦拭。

8. 保固：

除了在人為上的特意損壞，本產品是受保固並可以維修的，並不包含在安全規範的責任。

保固是以不超出發票上的金額，零件的更換及運送的費用。

保固是僅在正常操作下而造成的損壞，並不包含任何刻意的損壞，操作上的錯誤，機械上的操作不當，保養不當，負載或過壓。

原廠的保固僅包含有限的單純更換損壞的零件。使用者將不可歸據直接或間接的責任在原廠。

原廠的保固是賣出後的12個月內。如有任意的非原廠的維修或更換零件，原廠保固將自然取消。

9. 維修：

有任何的維修，保養或更換零件是在保固以外，請將產品退回原廠維修。

10. 附件：

- ADP-110V 或 ADP-220V: AC 電源轉換器(購買時請指定一種)。
- BP-250: 雙端BNC同軸纜線; 50 Ω 阻抗, RG58C UL, 長度 100 cm。
- BP-356N: 雙端香蕉插頭矽膠線; UL 6KV, 18AWG, Length 60cm(紅色,黑色各一)。
- BP-256N: 安規 IC 夾, UL 1000V CAT III(紅色,黑色各一)。
- BP-276N: 安規鱷魚夾, UL 1000V CAT II, 10A(紅色,黑色各一)。
- 使用說明書(TINSE0004S4)。

TR150

差 動 測 試 棒

TR150 差動測試棒

1. 簡述:

- TR150差動測試棒提供一個安全的儀器給所有的示波器使用, 它可以轉換由高輸入的差動電壓(≤ 7000 PEAK) 進入一個低電壓($\leq 7.0V$), 並且顯示波形在示波器上, 使用頻率高達50 MHz, 非常適合大電力測試、研發、維修使用。
- 差動測試棒輸出標示是設計在操作示波器 $1M\Omega$ 的輸入阻抗的相對衰減量, 當使用 50Ω 匹配器時衰減量剛好為2倍量。
- TR150差動測試棒, 也建議選購本公司生產的PL-10阻抗轉換器, 可以延伸差動測試棒的應用範圍-可以在數字電錶上觀測更精確的實際測試電壓值(示波器精確度為3%, 數字電錶約精準3倍)。

(注意) 如果沒有使用PL-10阻抗轉換器, 而直接連接數字電錶, 讀值的誤差將大於10%。

2. 規格:

- (1) 頻寬: DC - 50 MHz (-3dB) for x 200, x 500及 x 1000
DC - 25 MHz (衰減 x 100檔)
- (2) 衰減: x100, x 200, x 500, 或 x 1000
- (3) 精確度: $\pm 2\%$
- (4) 輸入電壓範圍 (DC + AC PEAK TO PEAK)
 - ≤ 700 Vp-p for x 100, (約230 Vrms 或DC)
 - ≤ 1400 Vp-p for x 200, (約460 Vrms 或DC)
 - ≤ 3500 Vp-p for x 500, (約1140 Vrms 或DC)
 - ≤ 7000 Vp-p for x 1000, (約2300 Vrms 或DC)
- (5) 允許最高輸入電壓:
最高差動電壓: 7000 V (DC + AC PEAK TO PEAK)
輸入端及接地端間最高電壓: 6500 Vrms
- (6) 輸入阻抗:
差動: $54 M\Omega / 1.2 pF$
單端到接地端間的輸入阻抗: $27 M\Omega / 2.3 pF$
- (7) 輸出電壓: $\leq \pm 7.0 V$

- (8) 輸出阻抗: $50\ \Omega$
- (9) 上升時間:
7 ns for x 200, x 500 及 x 1000
14 ns for x 100
- (10) 雜訊抑制率:
60 Hz: > 80 dB ; 100 Hz: > 60 dB ; 1 MHz: > 50 dB
- (11) 電源:
指定外接9 V DC 電源(必須是本公司承認指定品)
- (12) 耗電: 最大耗電量35 mA (0.4瓦特)

3. 測試棒面板說明



4. 操作環境及狀況

	一般狀態	使用操作中	儲存
溫度	+20°C ... +30°C	0°C ... +50°C	-30°C ... +70°C
溼度	≤70 % RH	10 % ... 85 % RH	10 % ... 90 % RH

(1) 尺寸及重量: 240 x 80 x 30 mm; 280g

(2) 電子安全規範 **IEC 1010-1**

- 雙絕緣
- 安裝類目 III
- 污染程度 2
- 相關電壓或最大接地: 6500 Vrms
- CE: EN50081-1 及 50082-1

(3) 請使用於室內環境。

5. 操作程序

- 將附件BP-356 與 BP-256N (或BP-276) 接起來後插入TR150 的輸入端, 並將BP-256N (或BP-276) 與測量物接觸。
- 將BP-250與TR150的輸出端連接, 並與示波器連結。
- 如有需要先調整示波器上的垂直開關。
- 將示波器上的衰減率及垂直開關調整到一致的位置, 如下表。
- 注意: 電源必須打開。

衰減	X 1000	X 500	X 200	X 100
最大輸入電壓 (DC+AC Peak)	7000Vp-p (±3500VDC)	3500Vp-p (±1750VDC)	1400Vp-p (±700VDC)	700Vp-p (±350VDC)

示波器上的 垂直偏向(V/DIV)	實 際 偏 向(V/DIV)			
	x 1000	x 500	x 200	x 100
1	1000	500	200	100
0.5	500	250	100	50
0.2	200	100	40	20
0.1	100	50	2	10
50 m	50	25	10	5
20 m	20	10	4	2
10 m	10	5	2	1
5 m	5	2.5	1	0.5
2 m	2	1	0.4	0.2

〔注意〕

實際的垂直偏向是等於衰減乘上示波器上所選擇的垂直偏向。如果是使用PL-50(50 Ω 負載器)時, 實際偏向值 x2 (等於2倍量)。

例如:

測試棒是 x 200, 示波器的垂直偏向在 0.5, 其實際的垂直偏向為:
 $200 \times 0.5 = 100 \text{ V/div}$

示波器輸入的負載是50 Ω , 偏向就為200 V/div

6. 維護:

保養此產品時請使用原廠指定的工具. 原廠將不負任何責任由其他不被認可的維修人員所做的維修。

本產品如超過60天不使用, 請將本產品至於防潮箱存放。

7. 清潔：

此產品不需要任何特定的清潔。如有需要，請用輕軟乾淨的布沾上微量的清潔液輕輕的在產品外觀擦拭。

8. 保固：

除了在人爲上的特意損壞，本產品是受保固並可以維修的，並不包含在安全規範的責任。

保固是以不超出發票上的金額，零件的更換及運送的費用。

保固是僅在正常操作下而造成的損壞，並不包含任何刻意的損壞，操作上的錯誤，機械上的操作不當，保養不當，負載或過壓。

原廠的保固僅包含有限的單純更換損壞的零件。使用者將不可歸據直接或間接的責任在原廠。

原廠的保固是賣出後的12個月內。如有任意的非原廠的維修或更換零件，原廠保固將自然取消。

9. 維修：

有任何的維修，保養或更換零件是在保固以外，請將產品退回原廠維修。

10. 附件：

- ADP-110V 或 ADP-220V: AC 電源轉換器(購買時請指定一種)。
- BP-250: 雙端BNC同軸纜線; 50 Ω 阻抗, RG58C UL, 長度 100 cm。
- BP-276N: 安規鱷魚夾, UL 1000V CAT II, 10A(紅色,黑色各一)。
- BP-266: 高壓專用IC夾, 最大6500V(DC+ACp-p)(紅色,黑色各一)。
- BP-366: 高壓專用雙端香蕉插頭矽膠線, 18AWG, UL 20KV, 長度 60cm(紅色,黑色各一)。
- 使用說明書(TINSE0004S4)。

TR1100

差 動 測 試 棒

TR1100 差動測試棒

1. 簡述:

- TR1100差動測試棒提供一個安全的儀器給所有的示波器使用, 它可以轉換由高輸入的差動電壓(≤ 7000 PEAK) 進入一個低電壓($\leq 7.0V$), 並且顯示波形在示波器上, 使用頻率高達100 MHz, 非常適合大電力測試、研發、維修使用。
- 差動測試棒輸出標示是設計在操作示波器 $1M\Omega$ 的輸入阻抗的相對衰減量, 當使用 50Ω 匹配器時衰減量剛好為2倍量。
- TR1100差動測試棒, 也建議選購本公司生產的PL-10阻抗轉換器, 可以延伸差動測試棒的應用範圍-可以在數字電錶上觀測更精確的實際測試電壓值(示波器精確度為3%, 數字電錶約精準3倍)。
(注意) 如果沒有使用PL-10阻抗轉換器, 而直接連接數字電錶, 讀值的誤差將大於10%。

2. 規格:

- (1) 頻寬: DC - 100 MHz (-3dB) for x 200, x 500及 x 1000
DC - 50 MHz (衰減 x 100檔)
- (2) 衰減: x100, x 200, x 500, 或 x 1000
- (3) 精確度: $\pm 2\%$
- (4) 輸入電壓範圍 (DC + AC PEAK TO PEAK)
 - ≤ 700 Vp-p for x 100, (約230 Vrms 或DC)
 - ≤ 1400 Vp-p for x 200, (約460 Vrms 或DC)
 - ≤ 3500 Vp-p for x 500, (約1140 Vrms 或DC)
 - ≤ 7000 Vp-p for x 1000, (約2300 Vrms 或DC)
- (5) 允許最高輸入電壓:
最高差動電壓: 7000 V (DC + AC PEAK TO PEAK)
輸入端及接地端間最高電壓: 6500 V RMS
- (6) 輸入阻抗:
差動: $54 M\Omega / 1.2 pF$
單端到接地端間的輸入阻抗: $27 M\Omega / 2.3 pF$
- (7) 輸出電壓: $\leq \pm 7.0 V$

(8) 輸出阻抗: $50\ \Omega$

(9) 上升時間:

3.5 ns for x 200, x 500 及 x 1000

7 ns for x 100

(10) 雜訊抑制率:

60 Hz: > 80 dB ; 100 Hz: > 60 dB ; 1 MHz: > 50 dB

(11) 電源:

指定外接9 V DC 電源(必須是本公司承認指定品)

(12) 耗電: 最大耗電量35 mA (0.4瓦特)

3. 測試棒面板說明



4. 操作環境及狀況

	一般狀態	使用操作中	儲存
溫度	+20°C ... +30°C	0°C ... +50°C	-30°C ... +70°C
溼度	≤70 % RH	10 % ... 85 % RH	10 % ... 90 % RH

(1) 尺寸及重量: 240 x 80 x 30 mm; 280g

(2) 電子安全規範 **IEC 1010-1**

- 雙絕緣
- 安裝類目 III
- 污染程度 2
- 相關電壓或最大接地: 6500 Vrms
- CE: EN50081-1 及 50082-1

(3) 請使用於室內環境。

5. 操作程序

- 將附件BP-356 與 BP-256N (或BP-276) 接起來後插入TR1100 的輸入端, 並將BP-256N (或BP-276) 與測量物接觸。
- 將BP-250與TR1100的輸出端連接, 並與示波器連結。
- 如有需要先調整示波器上的垂直開關。
- 將示波器上的衰減率及垂直開關調整到一致的位置, 如下表。
- 注意: 電源必須打開。

衰減	X 1000	X 500	X 200	X 100
最大輸入電壓 (DC+AC Peak)	7000Vp-p (±3500VDC)	3500Vp-p (±1750VDC)	1400Vp-p (±700VDC)	700Vp-p (±350VDC)

示波器上的 垂直偏向(V/DIV)	實 際 偏 向(V/DIV)			
	x 1000	x 500	x 200	x 100
1	1000	500	200	100
0.5	500	250	100	50
0.2	200	100	40	20
0.1	100	50	2	10
50 m	50	25	10	5
20 m	20	10	4	2
10 m	10	5	2	1
5 m	5	2.5	1	0.5
2 m	2	1	0.4	0.2

〔注意〕

實際的垂直偏向是等於衰減乘上示波器上所選擇的垂直偏向。如果是使用PL-50(50 Ω 負載器)時, 實際偏向值 x2 (等於2倍量)。

例如:

測試棒是 x 200, 示波器的垂直偏向在 0.5, 其實際的垂直偏向為:
 $200 \times 0.5 = 100 \text{ V/div}$

示波器輸入的負載是50 Ω , 偏向就為200 V/div

6. 維護:

保養此產品時請使用原廠指定的工具. 原廠將不負任何責任由其他不被認可的維修人員所做的維修。

本產品如超過60天不使用, 請將本產品至於防潮箱存放。

7. 清潔：

此產品不需要任何特定的清潔。如有需要，請用輕軟乾淨的布沾上微量的清潔液輕輕的在產品外觀擦拭。

8. 保固：

除了在人為上的特意損壞，本產品是受保固並可以維修的，並不包含在安全規範的責任。

保固是以不超出發票上的金額，零件的更換及運送的費用。

保固是僅在正常操作下而造成的損壞，並不包含任何刻意的損壞，操作上的錯誤，機械上的操作不當，保養不當，負載或過壓。

原廠的保固僅包含有限的單純更換損壞的零件。使用者將不可歸據直接或間接的責任在原廠。

原廠的保固是賣出後的12個月內。如有任意的非原廠的維修或更換零件，原廠保固將自然取消。

9. 維修：

有任何的維修，保養或更換零件是在保固以外，請將產品退回原廠維修。

10. 附件：

- ADP-110V 或 ADP-220V: AC 電源轉換器(購買時請指定一種)。
- BP-250: 雙端BNC同軸纜線; 50 Ω 阻抗, RG58C UL, 長度 100 cm。
- BP-276N: 安規鱷魚夾, UL 1000V CAT II, 10A(紅色,黑色各一)。
- BP-286: 安規接觸探頭棒; UL 1000V, CAT III(紅色,黑色各一)。
- BP-266: 高壓專用IC夾, 最大6500V(DC+ACp-p)(紅色,黑色各一)。
- BP-366: 高壓專用雙端香蕉插頭矽膠線, 18AWG, UL 20KV, 長度 60cm(紅色,黑色各一)。
- 工具箱(PX-502)。
- 使用說明書(TINSE0004S4)。

TR175

差 動 測 試 棒

TR175 差動測試棒

1. 簡述:

- TR175 差動測試棒提供一個安全的儀器給所有的示波器使用, 它可以轉換由高輸入的差動電壓($\leq 14\text{KV PEAK}$) 進入一個低電壓($\leq 7.0\text{V}$), 並且顯示波形在示波器上, 使用頻率高達75 MHz, 非常適合大電力測試、研發、維修使用。
- 差動測試棒輸出標示是設計在操作示波器 $1\text{M}\Omega$ 的輸入阻抗的相對衰減量, 當使用 $50\ \Omega$ 匹配器時衰減量剛好為2倍量。
- TR175 差動測試棒, 也建議選購本公司生產的PL-10阻抗轉換器, 可以延伸差動測試棒的應用範圍-可以在數字電錶上觀測更精確的實際測試電壓值(示波器精確度為3%, 數字電錶約精準3倍)。
(注意) 如果沒有使用PL-10阻抗轉換器, 而直接連接數字電錶, 讀值的誤差將大於10%。

2. 規格:

- (1) 頻寬: DC - 75 MHz (-3dB)
DC - 35 MHz (衰減 x 200檔)
- (2) 衰減: x 200, x 400, x 1000, 或 x 2000
- (3) 精確度: $\pm 2\%$
- (4) 輸入電壓範圍 (DC + AC PEAK TO PEAK)
 - $\leq 1400\text{ V}$ for x 200, (約460 Vrms 或DC)
 - $\leq 2800\text{V}$ for x 400, (約920 Vrms 或DC)
 - $\leq 7000\text{ V}$ for x 1000, (約2320 Vrms 或DC)
 - $\leq 14000\text{ V}$ for x 2000, (約4950 Vrms 或DC)
- (5) 允許最高輸入電壓:
 - 最高差動電壓: 14 KV (DC + AC PEAK TO PEAK)
 - 輸入端及接地端間最高電壓: 6500 Vrms
- (6) 輸入阻抗:
 - 差動: $54\text{ M}\Omega / 1.2\text{ pF}$
 - 單端到接地端間的輸入阻抗: $2\text{ M}\Omega / 2.3\text{ pF}$
- (7) 輸出電壓: $\leq \pm 7.0\text{ V}$

- (8) 輸出阻抗: 50 Ω
- (9) 上升時間:
4.7 ns for x 400, x 1000 及 x 2000
10 ns for x 200
- (10) 雜訊抑制率:
60 Hz: > 80 dB ; 100 Hz: > 60 dB ; 1 MHz: > 50 dB
- (11) 電源: 指定外接9 V DC 電源(必須是本公司承認指定品)
- (12) 耗電: 最大耗電量35 mA (0.4瓦特)

3. 測試棒面板說明



4. 操作環境及狀況

	一般狀態	使用操作中	儲存
溫度	+20°C ... +30°C	0°C ... +50°C	-30°C ... +70°C
溼度	≤70 % RH	10 % ... 85 % RH	10 % ... 90 % RH

(1) 尺寸及重量: 240 x 80 x 30 mm; 280g

(2) 電子安全規範 **IEC 1010-1**

- 雙絕緣
- 安裝類目 III
- 污染程度 2
- 相關電壓或最大接地: 6.5 KVRms
- CE: EN50081-1 及 50082-1

(3) 請使用於室內環境。

5. 操作程序

- 將附件BP-356 與 BP-256N (或BP-276) 接起來後插入TR175 的輸入端, 並將BP-256N (或BP-276) 與測量物接觸。
- 將BP-250與 TR175 的輸出端連接, 並與示波器連結。
- 如有需要先調整示波器上的垂直開關。
- 將示波器上的衰減率及垂直開關調整到一致的位置, 如下表。
- 注意: 電源必須打開。

衰減	X 2000	X 1000	X 400	X 200
最大輸入電壓 (DC+AC Peak)	14000Vp-p (±7000VDC)	7000Vp-p (±3500VDC)	2800Vp-p (±1400VDC)	1400Vp-p (±700VDC)

示波器上的 垂直偏向(V/DIV)	實 際 偏 向(V/DIV)			
	x 2000	x 1000	x 400	x 200
1	2000	1000	400	200
0.5	100	500	200	10
0.2	400	200	80	40
0.1	200	100	40	20
50 m	100	50	20	10
20 m	40	20	8	4
10 m	20	10	4	2
5 m	10	5	2	1
2 m	4	2	0.8	0.4

〔注意〕

實際的垂直偏向是等於衰減乘上示波器上所選擇的垂直偏向。如果是使用PL-50(50 Ω 負載器)時, 實際偏向值 x2 (等於2倍量)。

例如:

測試棒是 x 200, 示波器的垂直偏向在 0.5, 其實際的垂直偏向為:
 $200 \times 0.5 = 100 \text{ V/div}$

示波器輸入的負載是50 Ω , 偏向就為200 V/div

6. 維護:

保養此產品時請使用原廠指定的工具. 原廠將不負任何責任由其他不被認可的維修人員所做的維修。

本產品如超過60天不使用, 請將電池拔除並各別存放。

7. 清潔:

此產品不需要任何特定的清潔. 如有需要, 請用輕軟乾淨的布沾上微量的清潔液輕輕的在產品外觀擦拭。

本產品如超過60天不使用, 請將本產品至於防潮箱存放。

8. 保固：

除了在人爲上的特意損壞，本產品是受保固並可以維修的，並不包含在安全規範的責任。

保固是以不超出發票上的金額，零件的更換及運送的費用。

保固是僅在正常操作下而造成的損壞，並不包含任何刻意的損壞，操作上的錯誤，機械上的操作不當，保養不當，負載或過壓。

原廠的保固僅包含有限的單純更換損壞的零件。使用者將不可歸據直接或間接的責任在原廠。

原廠的保固是賣出後的12個月內。如有任意的非原廠的維修或更換零件，原廠保固將自然取消。

9. 維修：

有任何的維修，保養或更換零件是在保固以外，請將產品退回原廠維修。

10. 附件：

- ADP-110V 或 ADP-220V: AC 電源轉換器(購買時請指定一種)。
- BP-250: 雙端BNC同軸纜線; 50 Ω 阻抗, RG58C UL, 長度 100 cm。
- BP-276N: 安規鱷魚夾, UL 1000V CAT II, 10A(紅色,黑色各一)。
- BP-286: 安規接觸探頭棒; UL 1000V, CAT III(紅色,黑色各一)。
- BP-266: 高壓專用IC夾, 最大6500V(DC+ACp-p)(紅色,黑色各一)。
- BP-366: 高壓專用雙端香蕉插頭矽膠線, 18AWG, UL 20KV, 長度 60cm(紅色,黑色各一)。
- 工具箱(PX-502)。
- 使用說明書(TINSE0004S4)。

TR120

差 動 測 試 棒

TR120 差動測試棒

1. 簡述:

- TR120 差動測試棒提供一個安全的儀器給所有的示波器使用, 它可以轉換由高輸入的差動電壓($\leq 20\text{KV PEAK}$) 進入一個低電壓($\leq 7.0\text{V}$), 並且顯示波形在示波器上, 使用頻率高達20 MHz, 非常適合大電力測試、研發、維修使用。
- 差動測試棒輸出標示是設計在操作示波器 $1\text{M}\Omega$ 的輸入阻抗的相對衰減量, 當使用 $50\ \Omega$ 匹配器時衰減量剛好為2倍量。
- TR120 差動測試棒, 也建議選購本公司生產的PL-10阻抗轉換器, 可以延伸差動測試棒的應用範圍-可以在數字電錶上觀測更精確的實際測試電壓值(示波器精確度為3%, 數字電錶約精準3倍)。
(注意) 如果沒有使用PL-10阻抗轉換器, 而直接連接數字電錶, 讀值的誤差將大於10%。

2. 規格:

- (1) 頻寬: DC - 20 MHz (-3dB)
DC - 10 MHz (衰減 x 300檔)
- (2) 衰減: x 300, x 600, x 1500, 或 x 3000
- (3) 精確度: $\pm 2\%$
- (4) 輸入電壓範圍 (DC + AC PEAK TO PEAK)
 - $\leq 2000\text{ V}$ for x 300, (約700 Vrms 或DC)
 - $\leq 4000\text{V}$ for x 600, (約1400 Vrms 或DC)
 - $\leq 10000\text{ V}$ for x 1500, (約3500 Vrms 或DC)
 - $\leq 20000\text{ V}$ for x 3000, (約7000 Vrms 或DC)
- (5) 允許最高輸入電壓:
最高差動電壓: 20 KV (DC + AC PEAK TO PEAK)
輸入端及接地端間最高電壓: 6500 Vrms
- (6) 輸入阻抗:
差動: $118\text{ M}\Omega / 1.2\text{ pF}$
單端到接地端間的輸入阻抗: $59\text{ M}\Omega / 2.3\text{ pF}$
- (7) 輸出電壓: $\leq \pm 7.0\text{ V}$

- (8) 輸出阻抗: $50\ \Omega$
- (9) 上升時間:
 17.5 ns for x 600, x 1500 及 x 3000
 35 ns for x 300
- (10) 雜訊抑制率:
 60 Hz: > 80 dB ; 100 Hz: > 60 dB ; 1 MHz: > 50 dB
- (11) 電源: 指定外接9 V DC 電源(必須是本公司承認指定品)
- (12) 耗電: 最大耗電量35 mA (0.4瓦特)

3. 測試棒面板說明



4. 操作環境及狀況

	一般狀態	使用操作中	儲存
溫度	+20°C ... +30°C	0°C ... +50°C	-30°C ... +70°C
溼度	≤70 % RH	10 % ... 85 % RH	10 % ... 90 % RH

(1) 尺寸及重量: 240 x 80 x 30 mm; 280g

(2) 電子安全規範 **IEC 1010-1**

- 雙絕緣
- 安裝類目 III
- 污染程度 2
- 相關電壓或最大接地: 6.5 Kvrms
- CE: EN50081-1 及 50082-1

(3) 請使用於室內環境。

5. 操作程序

- 將附件BP-356 與 BP-256N (或BP-276) 接起來後插入TR120 的輸入端, 並將BP-256N (或BP-276) 與測量物接觸。
- 將BP-250與 TR120 的輸出端連接, 並與示波器連結。
- 如有需要先調整示波器上的垂直開關。
- 將示波器上的衰減率及垂直開關調整到一致的位置, 如下表。
- 注意: 電源必須打開。

衰減	X 3000	X 1500	X 600	X 300
最大輸入電壓 (DC+AC Peak)	20KVp-p (±10KVDC)	10KVp-p (±5KVDC)	4KVp-p (±2KVDC)	2KVp-p (±1KVDC)

示波器上的 垂直偏向(V/DIV)	實 際 偏 向(V/DIV)			
	x 3000	x 1500	x 600	x 300
1	3000	1500	600	300
0.5	1500	750	300	150
0.2	600	300	120	60
0.1	300	150	60	30
50 m	150	75	30	15
20 m	60	30	12	6
10 m	30	15	6	3
5 m	15	7.5	3	1.5
2 m	6	3	1.2	0.6

〔注意〕

實際的垂直偏向是等於衰減乘上示波器上所選擇的垂直偏向。如果是使用PL-50(50 Ω 負載器)時, 實際偏向值 x2 (等於2倍量)。

例如:

測試棒是 x 200, 示波器的垂直偏向在 0.5, 其實際的垂直偏向為:
 $200 \times 0.5 = 100 \text{ V/div}$

示波器輸入的負載是50 Ω , 偏向就為200 V/div

6. 維護:

保養此產品時請使用原廠指定的工具. 原廠將不負任何責任由其他不被認可的維修人員所做的維修。

本產品如超過60天不使用, 請將電池拔除並各別存放。

7. 清潔:

此產品不需要任何特定的清潔. 如有需要, 請用輕軟乾淨的布沾上微量的清潔液輕輕的在產品外觀擦拭。

本產品如超過60天不使用, 請將本產品至於防潮箱存放。

8. 保固：

除了在人爲上的特意損壞，本產品是受保固並可以維修的，並不包含在安全規範的責任。

保固是以不超出發票上的金額，零件的更換及運送的費用。

保固是僅在正常操作下而造成的損壞，並不包含任何刻意的損壞，操作上的錯誤，機械上的操作不當，保養不當，負載或過壓。

原廠的保固僅包含有限的單純更換損壞的零件。使用者將不可歸據直接或間接的責任在原廠。

原廠的保固是賣出後的12個月內。如有任意的非原廠的維修或更換零件，原廠保固將自然取消。

9. 維修：

有任何的維修，保養或更換零件是在保固以外，請將產品退回原廠維修。

10. 附件：

- ADP-110V 或 ADP-220V: AC 電源轉換器(購買時請指定一種)。
- BP-250: 雙端BNC同軸纜線; 50 Ω 阻抗, RG58C UL, 長度 100 cm。
- BP-276N: 安規鱷魚夾, UL 1000V CAT II, 10A(紅色,黑色各一)。
- BP-286: 安規接觸探頭棒; UL 1000V, CAT III(紅色,黑色各一)。
- BP-266: 高壓專用IC夾, 最大6500V(DC+ACp-p)(紅色,黑色各一)。
- BP-366: 高壓專用雙端香蕉插頭矽膠線, 18AWG, UL 20KV, 長度 60cm(紅色,黑色各一)。
- 工具箱(PX-502)。
- 使用說明書(TINSE0004S4)。

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