

# Protek

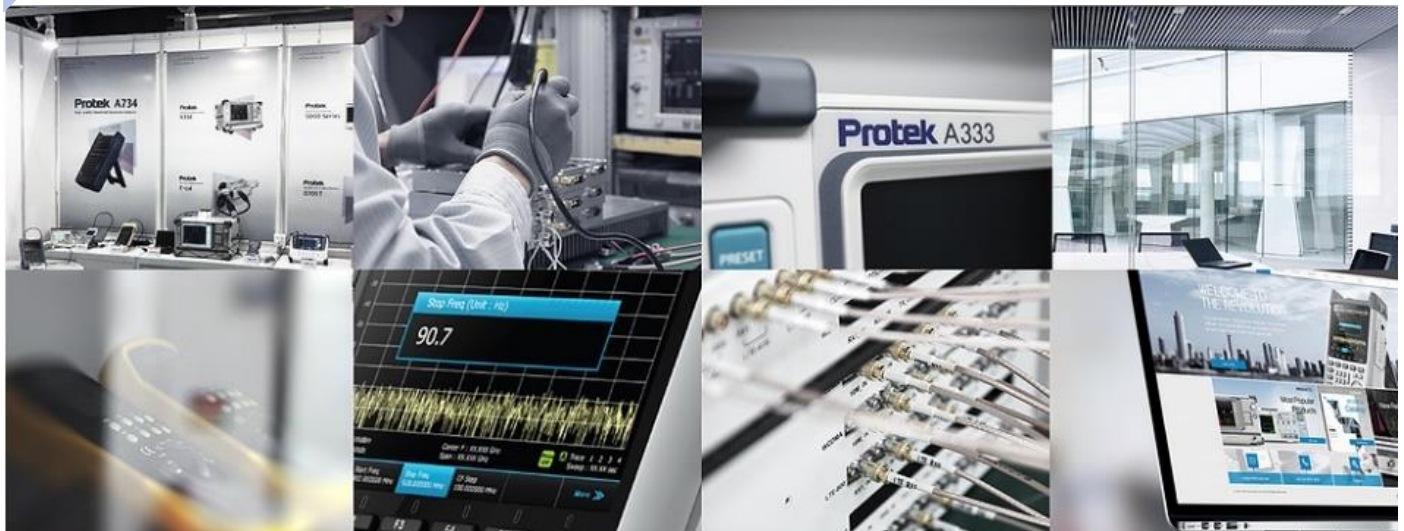
## Test & Measurement Instruments

# Catalogue



Protek Instrument Co.,Ltd

Korea's Leading Test&Measurement Instruments Brand **Protek**



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# RF Vector Network Analyzer

## Protek A333, A338 Series



The Protek A333 and Protek A338 vector network analyzers, which have already been proven in practice, are widely used in various communication fields with excellent and stable performance, and are especially optimized for research and development fields such as antennas, filters, and communication cables and production lines.

### Feature

- ▶ Test Frequency Range : 300kHz ~3.2GHz (Protek A333 2Ports)  
300kHz ~ 8GHz (Protek A338 2Ports)
- ▶ 4S parameter, frequency offset, and time domain provided as standard
- ▶ Dynamic Power Range : -55dBm ~ +10dBm (Protek A333)  
-60dBm ~ +10dBm (Protek A338)
- ▶ Application of full-touch 10.4"inch TFT LCD display
- ▶ Supports up to 200,001 measurement test points
- ▶ USB2 / LAN / Print Port / VGA / Keyboard Port / Mouse Port Interface Standard
- ▶ Compatibility with third-party calibration CALKIT
- ▶ WINDOW OS Base

## Specifications

Models	Protek A333	Protek A338	
Frequency Range	300 kHz ~ 3.2 GHz	300 kHz ~ 8 GHz	
Frequency Resolution	1 Hz		
CW Frequency Accuracy	$\pm 5 \times 10^6$		
Impedance	50 $\Omega$		
Input Port type	N-type Female		
Number of input ports	2 Ports		
IF Bandwidth Setting	1 Hz to 30 kHz (with 1/1.5/2/3/5/7 steps)		
Number of test points available	1 ~ 200,001		
Test point measurement speed	125 $\mu$ s	100 $\mu$ s	
harmonic distortion	-30 dBc	-25 dBc	
Non-Harmonic Spurious	-30 dBc		
Output power level	-60 dBm to +10 dBm (All Frequency ranges)	0.03~ 6GHz	-60 dBm to +10 dBm
		6~ 8 GHz	-60 dBm to +5 dBm
Output power level accuracy	$\pm 1.0$ dB	$\pm 1.5$ dB	
Transmission measurement accuracy The standard specifies a bandwidth of 10 Hz similar to that of the DUT as basic measurement data, and -10 dBm is the nominal source power. (Magnitude/Phase)	+5 dB~ +15 dB	0.2 dB	2°
	-50 dB~ +5 dB	0.1 dB	1°
	-70 dB~ -50 dB	0.2 dB	2°
	-90 dB~ -70 dB	1.0 dB	6°
Return Measurement Accuracy Specifications are DUT-like, with a bandwidth of 10 Hz as the default measurement data and -10 dBm is the nominal source power. Magnitude/Phase)	-15 dB~ 0 dB	0.4 dB	3°
	-25 dB~ -15 dB	1.0 dB	6°
	-35 dB~ -25 dB	3.0 dB	20°
Receiver noise level (IF bandwidth 10 Hz)	-120 dBm	-125 dBm	
Tracking noise (IF bandwidth 3 kHz)	0.001 dB rms		
Uncorrected Directivity	25 dB	18 dB	
Input Power	100 ~ 240 VAC 50/60Hz		
Power Consumption	50 W	60 W	
Size ( L x W x H )	About 320 x 439 x 238 mm	About 320 x 439 x 280 mm	
Weight	About 10.05 kg	About 10.65 kg	
Display	10.4"inch Full touch TFT LCD		
OS Base	WINDOW OS base		
Measurement add-on	4S parameter, time domain, frequency offset, screen division support		
Standard Interface	USB 2Port / LAN / Print Port / VGA / Keyboard Port / Mouse Port		
Optional	GPIB interface, VNA RF Calkit, RF Cable		
Standard Accessories	Manual, AC power cable		
Environment	Temperature : 5°C~39°C / Humidity : ~RH+80% Atmospheric pressure : 84 to 106.7 kPa, Altitude ~3000m		

# Handheld RF Cable&Antenna Analyzer

## **Protek** A434L



The Protek A434L portable RF antenna & cable analyzer, which is widely used in Korea and foreign communication equipment and facility maintenance sites, is a product specialized in measuring the communication environment of basic railway emergency disaster network communication or communication base station facilities. This product has already been tested.

### Feature

- ▶ Measurement frequency range : 5 MHz ~ 4 GHz
- ▶ Frequency Accuracy :  $<\pm 3$  ppm
- ▶ VSWR, DTF, Return Loss, Cable Loss Test support
- ▶ number of measurement test points : 1 ~ 2,001
- ▶ 7"inch Full touch TFT LCD WVGA(800x480) Display
- ▶ User-intuitive button arrangement configuration makes it easy for anyone to use
- ▶ USB / LAN interface standard
- ▶ Applying a smart battery that can be used continuously for up to 4 hours

## Specifications

	Model	Protek A434L
Main Specification	Max input power	+25 dBm Damage level
	Frequency range	5 MHz ~ 4 GHz
	Frequency Accuracy	< ±3 ppm
	Frequency Resolution	10 kHz
	Impedance	50 Ω
	Scan speed	< 1 ms / data point
	GUI screen display	Single & Dual mode
	Input port type	N Type Female
	Test Curve	Internal : 512MB, External : USB disk (Screen Storage Max : 32G)
	Screen	
	Setup	
VSWR	Number of test points	1 ~ 126, 251, 501, 1001, 2001개
	Return Loss Range	0 ~ -60 dB
	Display VSWR range	1 ~ 65
Cable Loss	Cable Loss Range	0 ~ -30 dB (Resolution : 0.01dB)
Interference introspection	ON-Frequency	+ 10 dBm
	ON-Channel	+ 20 dBm
DTF	Return Loss display coverage	0 ~ 60 dB
	Distance Range	0 ~ 1250 m (4125ft)
	Display VSWR range	0 ~ 65
General Specification	Interface	USB, LAN
	Size	About 260(W) x 193(H) x 67(D) mm
	Display	7"inch Full touch TFT LCD WVGA RGB 800 x 480 pixel
	Weight	About 2.45kg (include battery)
	Battery	Li-ion Battery 8.4V DC, 7800mAh
	Standard Accessories	Manual, AC Adaptor, Carrying bag, Battery
	Environment	Temperature : 0°C ~ +39C, Humidity : ~RH +70%, Altitude : ~3000m
	Input Power	(100 ~ 240V AC, 1.5A) DC 12V, 5A AC Adaptor
	Optional Accessories	RF CALKIT, RF CABLE, charging cradle

# Handheld RF Spectrum Analyzer

## **Protek** A733, A734 Series



Protek A734 & A733 Portable Spectrum Analyzer is a specialized instrument for measurement. wireless communication systems and communication devices such as drones, facility. It can be applied to perform measurements in more diverse environments. In particular, the new A733 has a Tracking Generator, Auto-Tune function, and VSWR measurement function (A733 option) that were not available in the existing A734.

### Feature

- ▶ Frequency Range : 100kHz ~ 4.4 GHz (A734), 9kHz ~ 3.2GHz (A733)
- ▶ Zero Span Function
- ▶ AM & FM Function (Audio listening) audio demodulation
- ▶ 5.7"inch TFT LCD WVGA (640x480) Display
- ▶ User-intuitive button arrangement configuration makes it easy for anyone to use
- ▶ USB / LAN / Earphone terminal interface
- ▶ Smart battery for up to 8 hours of continuous use
- ▶ Tracking generator, AUTO Tune Function (A733 only)
- ▶ VSWR Measurement Function (A733 only)

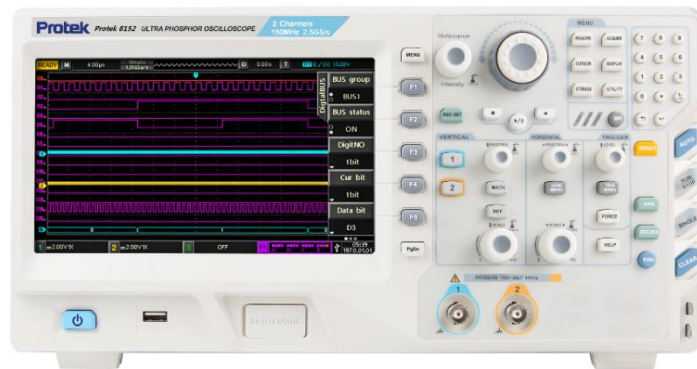
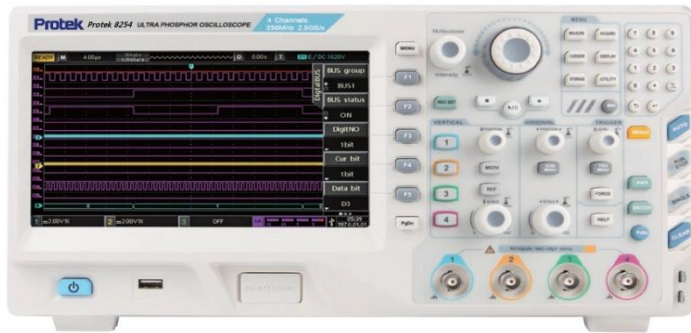
## Specifications

Models	Protek A734		Protek A733		
Frequency Range	100 kHz ~ 4.4 GHz		9 kHz ~ 3.2 GHz		
Span Type	Center Freq + Span or Start Freq + Stop Freq, ZERO Span				
Span	ZERO SPAN, 600 Hz~ 4.4 GHz		ZERO SPAN, 1 Hz~ 3.2 GHz		
Frequency accuracy	±1 PPM				
RBW	0.1Hz ~ 250kHz & 5MHz		10Hz ~ 1MHz		
Measurement Range	DANL ~ 1dB Gain Compression		DANL ~ 1.5dB Gain Compression		
	1dB Gain Compression (atten:15dB, preamp off)		(atten:10dB, preamp off)		
	+16dBm Typical, 1Hz~ 150MHz		+10dBm Typical, 9kHz~ 2MHz		
	+19dBm Typical, 150MHz~ 4.4GHz		+20dBm Typical, 2MHz~ 3.2GHz		
DANL ( Displayed Average Noise Level )	DANL : 0dB ATT, 1Hz RBW				
	주파수	PreAmp OFF	PreAmp ON	PreAmp OFF	PreAmp ON
	9kHz~100kHz	N/A	N/A	-108dBm	-131dBm
	100kHz~500kHz	-142dBm	N/A	-128dBm	-148dBm
	500kHz~10MHz	-142dBm	-153dBm	-128dBm	-148dBm
	10MHz~100MHz	-148dBm	-161dBm	-142dBm	-161dBm
	100MHz~1GHz	-144dBm	-158dBm	-141dBm	-161dBm
	1GHz~2.6GHz	-139dBm	-151dBm	-141dBm	-159dBm
	2.6GHz~3.2GHz	-135dBm	-151dBm	-140dBm	-158dBm
	3.3GHz~4.4kHz	-128dBm	-134dBm	N/A	N/A
Amplitude unit	dBm, dBmV, Watt, V		dBm, dBmV, dBuV, Watt, V		
Max Input Power Level	+20dBm		+33dBm		
DC Voltage Level	±0.2DCV max		50Vdc		
Zero Span Sweep Time	10 ms~ 2 s ( ±0.1% )		2ms~ 1000s ( ±0.1% )		
Sweep Trigger	Freerun, Single, External				
Trace	3 Trace		4 Trace		
Detector	min, max, sample, avg ( power , voltage , log )				
Marker	5 Marker		4 Marker		
Marker Function	peak, next peak, center=marker frequency				
Audio Demodulation	AM & FM				
Display	5.7"inch TFT LCD (640*480 pixels)				
Input Connector	RF Signal IN, N type Female 50Ω				
Reference Connector	10MHz in, BNC type Female				
Interface	USB, LAN, Earphone jack		USB, LAN, OTG, Earphone jack		
Size & Weight	260(W) x 160(H) x 61(D) mm / 1.75kg		265(W) x 265(H) x 71(D) mm / 2.9kg		
Input Power	DC12V/3A Adaptor (100 ~ 240V AC, 1.5A) / Power Consumption : About 32W				
Battery Type	Li-ion Battery 7.4V DC MAX, 7800mAh		2600mAh 18650 lithium ion Battery *4		
Environment	Temperature : 0°C ~ +39C, Humidity : ~RH +70%, Altitude : ~3000m				
Tracking Generator	Not Support		Tracking Range : 5MHz ~ 3GHz		
Standard Accessories	Battery pack, Manual, AC Adaptor, Carrying bag				
Optional Accessories	RF CALKIT, RF CABLE, charging cradle, VSWR Measure KIT(A733, Factory only )				



# Digital Mixed/Signal Oscilloscope

## Protek 8050 Series



The newly released Protek 8050 series digital mixed signal oscilloscope is a high-end lineup that has greatly improved the existing Protek 8000 series based on Protek's unique Ultra Phosphor technology. It is a high-performance mixed-signal oscilloscope equipped with easy-to-use, better features and specifications.

### Feature

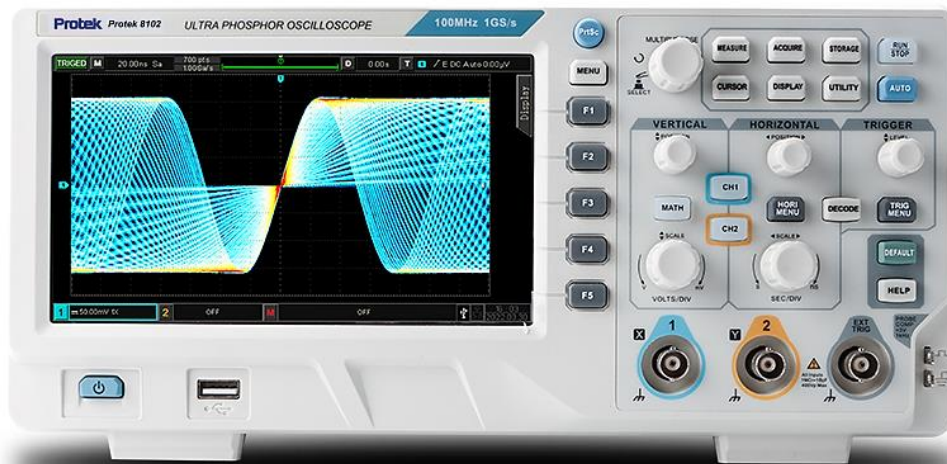
- ▶ **Input Channels: 2CH or 4CH Models & Digital Logic 16Channels (Optional)**
- ▶ **Bandwidth : 350 MHz or 500 MHz Models**
- ▶ **Realtime Sampling rate : Max 2.5 GS/s**
- ▶ **Long Memory Depth: 70 Mpts**
- ▶ **Fast waveform capture rate : Max. 1,000,000 wfms/s**
- ▶ **Built-in 50MHz 2CH arbitrary waveform function generator (Optional)**
- ▶ **Built-in Multiple triggering and decoding (I2C,CAN,LIN,RS232 etc...) capabilities (Optional)**
- ▶ **4 split screen function support (4-channel model only)**
- ▶ **Supports waveform recording of up to Max. 120,000 frames**
- ▶ **8"inch Pull Touch TFT LCD Display**

## Specifications

Models	Protek 8352	Protek 8354	Protek 8502	Protek 8504
Bandwidth	350 MHz		500 MHz	
Analog Input Channels	2 CH (1M $\Omega$ /50 $\Omega$ )	4 CH (1M $\Omega$ /50 $\Omega$ )	2 CH (1M $\Omega$ /50 $\Omega$ )	4 CH (1M $\Omega$ /50 $\Omega$ )
Digital Input Channels	Logic 16 CH ( Digital Logic Selected Optional )			
Real Time Sampling rate	2.5 GSa/s (Each Channel : 1.25GSa/s)			
Memory Depth	70 Mpts			
Rise Time	$\leq 1$ ns	$\leq 1$ ns	$\leq 750$ ps	$\leq 750$ ps
Coupling Mode	AC, DC, GND			
Vertical Resolution	8 bit			
Vertical axis range	1mV/div ~ 20 V/div (1-2-5 base)			
bandwidth limit	20 MHz			
DC Gain Accuracy	$\leq \pm 3\%$ (Sampling or average sampling method)			
Time base range	2ns/div ~ 40s/div (1-2-4 base)			
Time base Accuracy	$\leq \pm (50 + 2 \times \text{Service Life})$ ppm			
Time base mode	YT, XY, ROLL, 4 split screen function, ZOOM			
Waveform capture rate	Max. 1,000,000 wfms/s (Fast Mode)			
Frequency Counter	6 Digit			
Acquire Mode	Sampling, peak detection, high resolution, envelope, and average			
Waveform display method	sin(x)/x			
Trigger Mode	Edge, Pulse width, Runt, Window, N-edge, Delay, Time out, Duration, Setup/Hold, Slope, Video, Code Trigger			
Decode Mode	I2C, SPI, USB, CAN, CAN-FD, LIN, RS232, FlexRay, Bode plot loop test (Optional)			
36's Measurement Parameter	Maximum, minimum, peak-to-peak, median, top, bottom, amplitude, period average, average, periodic RMS, RMS, overshoot, preshoot, frequency, period, rise time, fall time, positive pulse width, negative pulse width, rise delay, fall delay, FRR, FRF, FFR, FFF, LRF, LRR, LFR, LFF, positive duty ratio, negative duty ratio, phase, area, cycle area, etc.			
Cursor Mode	Manual, Tracking cursor display			
Math Mode	A+B, A-B, A×B, A/B, FFT, logic, digital filtering, advanced			
Logic Function	AND, OR, NOT, XOR			
Built-in Arbitrary waveform/function generator output frequency range (50MHz, 250MSa/s, 2CH Resolution : 1 $\mu$ Hz ) (Optional)	Sine wave : 1 $\mu$ Hz~50MHz / (Harmonic distortion : < 1% (DC~20kHz, 1Vpp) )			
	Square wave : 1 $\mu$ Hz~15MHz / (Duty : 1~ 99%)			
	Ramp wave : 1 $\mu$ Hz~400kHz / (Symmetry : 0.1~99.9%)			
	Pulse wave : 1 $\mu$ Hz~15MHz / (Pulse width : $\geq 20$ ns)			
	Gaussian Noise : 50MHz bandwidth (-3dB) (typical value)			
	Arbitrary wave : 1 $\mu$ Hz~5MHz / (Vertical Resolution : 16 bit. Memory depth : 512kpts)			
Output amplitude range	10mVpp~3Vpp; (50 $\Omega$ ) / 20mVpp~6Vpp; (High Impedance)			
DC offset	$\pm 1.5$ V (50 $\Omega$ ) , $\pm 3$ V (High Impedance)   Accuracy : Offset setting $\pm 2\%$			
Modulation function	AM , FM			
Data Storage	Internal : 256 data, External : USB Disk Storage (Bitmap file), wave recording : ~120,000Frames			
Display	8"inch Pull Touch TFT LCD, RGB 800 x 480 pixels, 24bit True color			
Interface	USB-Host, USB-Device, EXT Trig, VGA, Pass/Fail			
Input Power	AC 100V ~ 240VACrms, 45Hz ~ 440Hz (2.5A, T 250V Fuse)			
Environment	Temperature : 0°C ~ +40°C, Humidity : ~RH +80%, Altitude : ~3000m			
Size	About 370(W)×185(H)×115(D) mm			
Weight	About 4.5 kg (Protek8352/8502) / About 4.8 kg (Protek8354/8504)			
Standard Accessories	Passive Probe kit, USB Interface Cable, AC Power Cable, GUI CD (in manual)			
Optional Accessories	LXI(LAN), Digital 16CH Logic, Digital Multimeter Module, Decode Function, AWG (*Factory Only)			

# Digital Storage Oscilloscope

## Protek 8002 Series



The Protek 8002 series is a mid-level device recommended for those who are efficient and practical. It is equipped with a TFT high-resolution wide display, a high memory of 56Mpts, and a digital trigger, enabling clean and fast signal analysis. It is a reasonable product that allows customers to use it effectively in various measurement environments.

### Feature

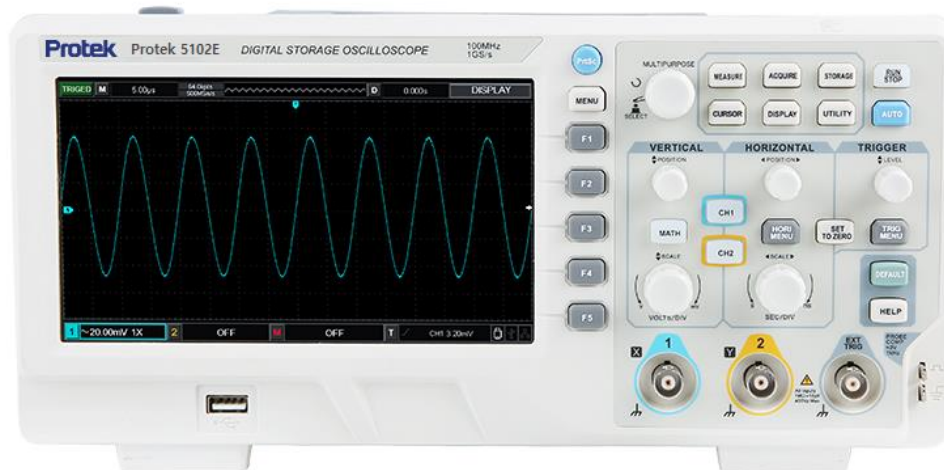
- ▶ **Input Channels : 2CH + EXT**
- ▶ **Bandwidth : 100 MHz or 200MHz**
- ▶ **Realtime Sampling rate : Max 1 GSa/s**
- ▶ **Memory depth : 56Mpts**
- ▶ **Waveform capture rate : 500,000 wfms/s**
- ▶ **Supports direct help function, digital trigger function and decoding function (optional)**
- ▶ **High resolution WVGA TFT LCD (800x480) Wide Display**
- ▶ **Supports waveform recording up to 100,000 frames**
- ▶ **Support for various interface functions (USB, LAN, P/F, etc.) (some optional)**

## Specifications

Model	Protek 8102	Protek 8202
Analog input	2Channels + EXT	
bandwidth	100MHz	200MHz
Real-time sampling	1 GSa/s (Each Channel : 500 MSa/s)	
Memory depth	56 Mpts	
Rise Time	≤ 3.5 ns	≤ 1.8 ns
Input impedance	(1MΩ±2%) // (16pF±3pF) / Input Voltage : 400V MAX (DC+Vpeak)	
Vertical resolution	8 bit	
Vertical axis range	1mV/div ~ 20 V/div (1-2-5 base)	
Bandwidth limit	20 MHz	
DC Gain	≤ ±3% (Sampling or average sampling method)	
Time base range	2ns/div ~ 1000s/div	1ns/div ~ 1000s/div
Time accuracy	≤ ± (50+ 2×Service Life)ppm	
Time base mode	YT, XY, ROLL, ZOOM	
Input coupling	AC, DC, GND	
Waveform capture rate	Max 500,000 wfms/s (Fast Acquire mode)	
Frequency meter	7 bit	
Acquisition Mode	Sampling, peak detection, high resolution, envelope, and average	
Waveform format	sin(x)/x	
Trigger Mode	Edge, Pulse Width, Runt, Nth Edge, Delay, Duration, Setup/Hold, Slope, Video, Pattern RS232/UART, I2C, SPI (Optional)	
Decode (Optional)	I2C, SPI, UART, CAN, RS232, LIN (Optional)	
36 Measure Parameters	Max, Min, Peak-Peak, Top, Bottom, Amplitude, Cycle Mean, Mean, Middle, Cycle RMS, RMS, Overshoot, Pre shoot, Frequency, Cycle, Rise Time, Fall Time, Positive Pulse, Negative Pulse, Positive Duty Ratio, Negative Duty Ratio, Delay A→B, Delay A→B, Phase A→B, Phase B→A, Area, Cycle Area. etc	
Cursor mode	Manual, Tracking, Cursor Display	
Math	A+B, A-B, A×B, A/B, FFT advanced	
Storage	include (256EA), USB Disk Storage(BMP,etc), Waveform recording : ~100,000Frames	
Display	WVGA TFT 7" LCD 800 x 480 pixels, 24bit true color	
Interface	USB-Host, USB-Device, EXT Trig, VGA, P/F	
Input Power	AC 100V ~ 240VACrms, 45Hz ~ 440Hz (2.5A, T 250V Fuse)	
Environment	Temp : 0°C ~ +40°C, Hum : RH 80%, altitude : 3000m	
Size	About 30(W)×138(H)×107(D) mm	
weight	About ~3kg	
Accessories	Probe kit / AC power cable / USB cable / CD	
Optional	Digital Decode & Trigger Function / LAN Interface (Factory only)	

# Digital Storage Oscilloscope

## Protek 5002E Series



The Protek 5002E series has been the most popular basic model among Protek's oscilloscope lineup for a long time since its launch and has been loved by many customers. It is an economical and reasonable product composed of the most faithful functions.

### Feature

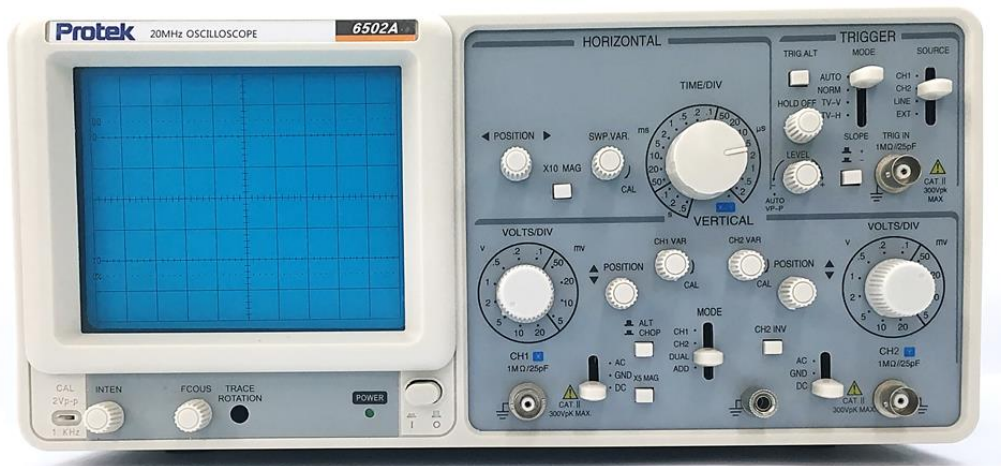
- ▶ **Input Channels : 2 CH + EXT**
- ▶ **Bandwidth : 50 MHz(5062E) / 100MHz(5102E) / 200MHz(5202E)**
- ▶ **Realtime Sampling rate : Max 1 GS/s**
- ▶ **Memory depth: 64 kpts**
- ▶ **Waveform capture rate: 5,000 wfms/s**
- ▶ **Direct print function and user-intuitive button arrangement configuration**
- ▶ **High-resolution 7" inch TFT WVGA (800×480) LCD display**
- ▶ **Supports waveform recording of up to 1,000 frames**
- ▶ **USB, P/F interface**

## Specifications

Models	Protek 5062E	Protek 5102E	Protek 5202E
Bandwidth	50 MHz	100 MHz	200 MHz
Analog Input Channels	2 CH + EXT		
Real Time Sampling rate	1 GSa/s (Each Channel : 500 MSa/s)		
Memory Depth	64 kpts		
Rise Time	≤ 7 ns	≤ 3.5 ns	≤ 1.7 ns
Input Impedance	(1MΩ±2%) // (18pF±3pF)		
Coupling Mode	AC, DC, GND		
Vertical Resolution	8 bit		
Vertical axis range	1mV/div ~ 20 V/div (1-2-5 base)		
bandwidth limit	20 MHz		
DC Gain Accuracy	≤ ±3% (Sampling or average sampling method)		
Time base range	2 ns/div ~ 50 s/div (1-2-5 base)		
Time base Accuracy	≤ ±(50+ 2×Service Life) ppm		
Time base mode	YT, XY, ROLL, ZOOM		
Waveform capture rate	5,000 wfms/s		
Frequency Counter	6 Digit		
Acquire Mode	Sampling, peak detection, high resolution, envelope, and average		
Waveform display method	sin(x)/x		
Trigger Mode	Edge, pulse, alternate, Slope, video		
Measurement Parameter	Max, Min, High, Low, Ampl, Pk-Pk, Middle, Mean, CycMean, RMS, C ycRMS, Period, Freq, Rise, Fall, RiseDelay, FallDelay, +Width, -Width, FRR, FRF, FFR , FFF, LRF, LRR, LFR, LFF, +Duty, -Duty, Area, CycArea, OverSht, PreSht, Phase. etc		
Cursor Mode	Manual, Tracking cursor display		
Math Mode	A+B, A-B, A×B, A/B, FFT		
Waveform Recording	~1,000Frames		
Data Storage	Internal : 20 data, External : USB Disk Storage (Bitmap file)		
Display	7"inch TFT LCD, RGB 800 x 480 pixels		
Interface	USB-Host, USB-Device, Pass/Fail		
Input Power	AC 100V ~ 240VACrms, 45Hz ~ 440Hz (2.5A, T 250V Fuse)		
Environment	Temperature : 0°C ~ +40°C, Humidity : ~RH +80%, Altitude : ~3000m		
Size	About 336(W)×164(H)×108(D) mm		
Weight	About 3.5 kg		
Standard Accessories	Passive Probe kit, USB Interface Cable, AC Power Cable, GUI CD (in manual)		
Optional Accessories	DSO Education Board		

# Analog CRT Oscilloscope

## Protek 6500A Series



The analog oscilloscope Protek 6500A series is a product with a fast measurement response speed by applying a 5" 12kV class high-definition CRT. You can check more accurate measurement values by applying.

### Feature

- ▶ **Input Channels: 2CH**
- ▶ **Bandwidth: 20 MHz(6502A) / 40MHz(6504A) / 60MHz(6506A)**
- ▶ **Applying 1mV class high sensitivity sensitive rotary**
- ▶ **Application of high-definition 5" 12kV CRT monitor (4 Trace)**
- ▶ **Trigger Lock Function Support**
- ▶ **User-intuitive button layout configuration**
- ▶ **Application of individual control rotary for each channel**
- ▶ **AUTO, NORMAL, TV-V, TV-H Trigger Function Support**

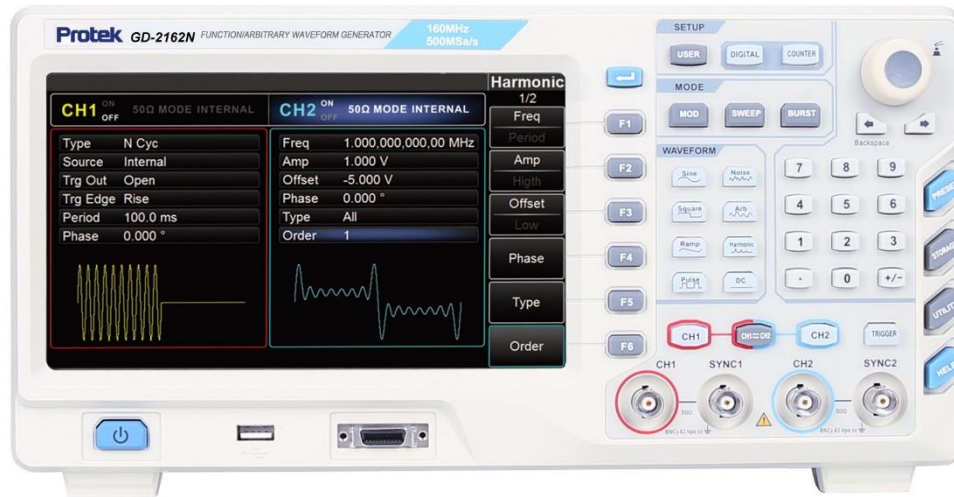
## Specifications

Models	Protek 6502A	Protek 6504A	Protek 6506A
Bandwidth	DC ~20MHz (-3dB)	DC ~40MHz (-3dB)	DC ~60MHz (-3dB)
Analog input Channels	2 CH		
Operating Mode	CH A, CH B, DUAL, ADD, CHB Inverse		
Vertical axis range	1 mV/DIV~1 V/DIV(10MHz, -3dB), x5 gain selected, 5 mV/DIV~ 5 V/DIV		
Input Impedance	1 MΩ ±2%, 25 pF ±3 pF		
Rise Time	17.5 ns	15 ns	12.5 ns
Horizontal Type	Main, Mix, Delay, Hold off Time (5:1 Variable)		
X-Y mode	Switch Selectable Using X-Y Switch; CH1= X axis ±3%; CH2= Y axis ±6%		
Horizontal sensitivity	X axis ±6%; Y axis ±3%, X-Y Phase Difference: <3°(50kHz)		
Sweep magnification	X10, ±10%, Extend Sweep Speed up to 20~50nS/DIV		
Sweep Type	0.2 μS/DIV~ 0.5 S/DIV in 1-2-5 Sequence, 20 Step ; Accuracy ±3%		
Trigger	AUTO, NORMAL TV-V, TV-H,		
Trigger source	INT, CH2, Line, EXT		
Coupling Mode	AC, DC, GND		
trigger sensitivity	Int: 2 division ( 2division with TV Coupling), Ext: 0.3V / (1Vpp)		
Slope	+ / -		
CRT monitor	12kV, 5"inch Diagonal, 8x10DIV (1DIV=1cm), P31 phosphor		
CAL	Square Wave About 1kHz, 2Vp-p ±3%,		
probe magnification	1X, 10X		
Input Power	110 ~ 127VAC or 220~240 VAC ±10%, 50~60 Hz±2Hz Approximately 35 W		
Environment	Temperature : 0°C ~ +40°C, Humidity : ~RH +80%, Altitude : ~3000m		
Size	About 316(W) X 132(H) X 410(D) mm		
Weight	About 7.8 kg	About 8.5 kg	About 9.5kg
Standard Accessories	Passive Probe kit, AC Power Cable, Manual		



# DDS Arbitrary/Waveform Function Generator

## Protek GD-2000N Series



The new Protek GD-2000N series is a multifunctional signal generator that combines various functions such as function generator, arbitrary waveform generator, pulse generator, harmonic generator, analog/digital modulator, digital signal output, and frequency counter. A clean and accurate signal output is possible. In addition, with perfect dual output through the same performance and design, by implementing a fast sampling rate of 500 MSa/s and arbitrary waveforms of 32 Mpts, adopting an 8" inch large wide display, along with various interfaces, provides application developers with new measurement capabilities. environment..

### Feature

- ▶ Output Channels : 2 CH (All Sync Terminal)
- ▶ Max Frequency : 80 MHz(GD2082N / 120MHz(GD2122N) / 160MHz(GD2162N)
- ▶ Sampling Rate : Max to 500 MS/s
- ▶ Long Memory depth: 32Mpts
- ▶ Rich Modulation Function AM,FM,PM, ASK,FSK,PSK,PWM,QAM,BPSK,QPSK,OSK,SUM
- ▶ Built in 800 MHz Frequency Counter
- ▶ High Vertical Resolution : 16 bit
- ▶ High-resolution 8" inch TFT WVGA (800×480) LCD display
- ▶ Digital signal output (I2C, SPI, RS232, UART) Optional

## Specifications

Models	GD-2082N	GD-2122N	GD-2162N
Frequency Output	~80 MHz	~120 MHz	~160 MHz
Output Channels	2 CH + ALL SYNC Terminal		
Sampling Rate	500 MSa/s		
Memory depth	32 Mpts		
Impedance	50Ω, typical / Isolation : 42Vpk maximum to earth (Protection in case of short circuit and overload)		
Vertical Resolution	16 bit		
Frequency Resolution	1 uHz (Accuracy : ±50 ppm)		
Modulation function	AM,FM,PM,ASK,FSK,PSK,PWM,QAM,BPSK,QPSK,OSK,SUM,SWEEP,Burst,GateTime		
Sine wave	1uHz~ 80MHz	1uHz~ 120MHz	1uHz~ 160MHz
Square wave	1uHz~ 30MHz	1uHz~ 40MHz	1uHz~ 50MHz
Pulse wave	1uHz~ 30MHz	1uHz~ 40MHz	1uHz~ 50MHz
Ramp wave	1uHz~ 2MHz	1uHz~ 3MHz	1uHz~ 4MHz
Harmonic	1uHz~ 40MHz	1uHz~ 50MHz	1uHz~ 80MHz
Noise (-3dB)	80MHz Bandwidth	120MHz Bandwidth	160MHz Bandwidth
Arbitrary wave	Memory : 32Mpts, Resolution : 16bit, Fall/Rise : 5ns, Jitter : 6ns+30ppm, Volatile memory 7GB		
Duty ratio	0.01%~ 99.99%		
Amplitude Range (50Ω)	≤ 20MHz : 1mVpp~ 10Vpp ; ≤ 80MHz : 1mVpp~ 5Vpp ; ≤ 120MHz : 1mVpp~ 2.5Vpp ; ≤ 160MHz : 1mVpp~ 1Vpp ; (High-Z: x2 Increase)		
Amplitude Accuracy	≤ 10MHz : ±0.1dB ; ≤ 100MHz : ±0.2dB ; ≤ 120MHz : ±0.4dB ; ≤ 160MHz : ±0.8dB (Reference : 1kHz sine wave, 5Vpp, ~1Vpp ; Accuracy (1kHz sine)		
DC offset	±5V(50Ω) ; ±10V (High-Z) / ±(2% of Offset setting+ 0.5% of amplitude +2mV)		
External modulation input	±5Vpk full-scale ; 5kΩ input impedance, Frequency Range : 10MHz±500Hz I/O level : 80mVpp~ 10Vpp/0dB, (typical), 2kΩ/50Ω, typical, AC coupled Lock time : <1s, External trigger : TTL Compatible, Phase deviation: 0°~360°,		
Trigger Input	Input Level : TTL Compatible, Slope : Rise or Fall, Pulse width : > 50ns Input impedance : > 10kΩ , DC-coupled, LinearSweep : < 100ns, BurstDelay : < 300ns		
Trigger output	TTL Compatible, 50Ω, Pulse width : > 60ns, Max Frequency : 1MHz		
SYNC output	TTL Compatible, 50Ω		
Frequency counter	Range : 100mHz~800MHz, TTL Compatible (200mVpp ~ 9Vpp), Accuracy : 51ppm Resolution : 7bit, Trigger sensitive : 0~100%, Coupling mode : AC, DC		
Digital interface	I2C, SPI, RS232, UART digital protocol signal output (Optional)		
Display	8"inch TFT LCD, WVGA RGB 800 x 480 pixels		
Interface	USB-Host, USB-Device, LAN		
Input Power	AC 100V ~ 240VACrms, 45Hz ~ 440Hz (2A, T 250V Fuse)		
Environment	Temperature : 0°C ~ +40°C, Humidity : ~RH +80%, Altitude : ~3000m		
Size & Weight	Size : About 336(W)×164(H)×108(D) mm / Weight : About 3.5 kg		
Standard Accessories	Output Cable kit, USB Interface Cable, AC Power Cable, GUI CD (in manual)		
Optional Accessories	Digital protocol signal output Module (Optional, Factory Only)		

# DDS Arbitrary/Waveform Function Generator

## Protek GD-1002N Series

The new Protek GD-1002N Series Arbitrary Waveform/Function Generator is a middle lineup model added by greatly improving the performance of the already proven GD-1000N Series. It generates high-precision, stable, low-distortion, and clean signals, and it is a product that can perform various tasks in various measurement environments through its powerful modulation function and waveform graphic design function.



### Feature

- ▶ Max Frequency 25MHz(GD1022N)/ 40MHz(GD1042N) / 60MHz(GD1062N)
- ▶ Fast sampling rate of 300MS/s and high memory of 2Mpts
- ▶ 16bit high vertical axis resolution and low frequency resolution of 1uHz
- ▶ High-resolution 4.3-inch TFT LCD application, WVGA (480\*272 pixels)
- ▶ Supports rich modulation function  
(AM,DSB - AM,FM,PM,ASK,FSK,PSK,BPSK,QPSK,3 FSK,4 FSK,OSK,PWM)
- ▶ Equipped with 2-channel output and modulation, SYNC terminal
- ▶ USB 2.0 Host & Device interface, Built in 80MHz Frequency counter
- ▶ Supports direct help function and direct initialization function

## Specifications

Models	GD-1022N	GD-1042N	GD-1062N
Frequency Output	~25 MHz	~40 MHz	~60 MHz
Output Channels	2 CH		
Sampling Rate	300 MSa/s		
Memory depth	2 Mpts		
Impedance	50Ω, typical		
Vertical Resolution	16 bit		
Frequency Resolution	1 uHz (Accuracy : ±1ppm)		
Modulation function	AM, DSB-AM, FM, ASK, FSK, PSK, BPSK, QPSK, 3FSK, 4FSK, OSK, PWM		
Sine wave	1uHz~ 25MHz	1uHz~ 40MHz	1uHz~ 60MHz
Square wave	1uHz~ 15MHz	1uHz~ 15MHz	1uHz~ 15MHz
Pulse wave	1uHz~ 15MHz	1uHz~ 15MHz	1uHz~ 15MHz
Ramp wave	1uHz~ 2MHz	1uHz~ 2MHz	1uHz~ 2MHz
Harmonic	1uHz~ 10MHz	1uHz~ 20MHz	1uHz~ 30MHz
Note	Channel1 waveform signal output reference		
Noise (-3dB)	100MHz Bandwidth		
Arbitrary wave	Frequency : 15MHz, Memory : 2Mpts, Vertical Resolution : 16bit, Fall/Rise : 9ns, Jitter : 10ns+30ppm		
Duty ratio	0.001%~ 99.999% (Depends on the frequency range)		
Amplitude Range	~10MHz : 1mVpp~10Vpp (50Ω) / 2mVpp~20Vpp (HighZ) ~55MHz : 1mVpp~5Vpp (50Ω) / 2mVpp~10Vpp (HighZ)		
Amplitude Accuracy	±(1% of set value+1mVpp) (1kHz sine wave, 5Vpp, ~1Vpp ; Accuracy (1kHz sine)		
DC offset	±5V(50Ω) ; ±10V (High-Z) / ±(2.5% of Offset setting+ 0.5% of amplitude +2mV)		
modulation characteristics	Modulation Frequency : 2MHz~1MHz (Depth : 0~120%), Impedance : 50 Ω, Phase deviation : 0°~360°, Sweep time : 1ms~ 50ks, Hold Return time : 1ms~ 50ks		
Trigger Input	TTL Compatible, Slope : Rise or Fall, Pulse width : > 100ns Input impedance : > 50Ω , DC-coupled		
Trigger output	TTL Compatible, 50Ω, Pulse width : > 60ns, 최대주파수 : 1MHz		
SYNC output	TTL (50Ω)		
Frequency counter	Range : 2MHz~80MHz, Accuracy : 51ppm, Resolution : 6 bit, Coupled : DC, Level : 0~3.3V		
Display	4.3"inch TFT LCD, WVGA RGB 480 x 272 pixels		
Interface	USB-Host, USB-Device		
Input Power	AC 100V ~ 240VACrms, 45Hz ~ 440Hz (0.5A, T 250V Fuse)		
Environment	Temperature : 0°C ~ +40°C, Humidity : ~RH +80%, Altitude : ~3000m		
Size & Weight	Size : About 310(W)×110(H)×260(D) mm / Weight : About 3 kg		
Standard Accessories	Output Cable kit, USB Interface Cable, AC Power Cable, GUI CD (in manual)		

# Function Generator

## Protek 9205A, 9205C Series

The Protek 9205A/C series function generator is a proven analog type product that has been used for basic electrical, electronic, and communication education for the past 30 years, and is a practical product that can help you understand basic signals.



### Feature

- ▶ Max Output Frequency ~2MHz
- ▶ Analog control type output
- ▶ 6-digit segment output and 3-digit voltage value dual output (9205C)
- ▶ External modulation and VCF, TTL support
- ▶ Sweep Function (9205C)
- ▶ Built in 10MHz Frequency Counter
- ▶ Sine wave, triangle wave, square wave, pulse wave output
- ▶ User-intuitive and easy button layout configuration

## Specifications

Models	Protek 9205A	Protek 9205C
Frequency Output	0.2 Hz ~ 2 MHz	
Waveforms	Sine wave, Triangle wave, Pulse wave, Square wave	
Display	6Digit Single LED	6Digit + 3Digit Dual LED
Display Accuracy	6digits ±2% ±1word	6digits ±2% ±1word
Impedance	50 Ω	
Frequency Resolution	0.1Hz / 1 Hz	
Square fall time	100 ns	80 ns
I/O port	Output, TTL, CMOS port	
Modulation Function	Not Support	External FM Modulation Frequency : 2Hz~10MHz, impedance : 50 Ω,
Sweep Function	Not Support	Linear / Log
Duty ratio	10~ 90%	20~ 80%
Amplitude range	2mVpp~10Vpp (50Ω) / 2mVpp~20Vpp (1MΩ)	
Amplitude error	±15%±1word	
Amplitude resolution	3digits, 1mVp-p	
Attenuator	20dB, 40dB selected	
DC offset	±10V (1MΩ) , ±5V (50Ω)	
TTL/CMOS Amplitude	"0" : ≤0.4V ; "1" : ≥3.5V	"0" : ≤0.6V ; "1" : ≥2.8V
TTL output impedance	600 Ω	
VCF Function	Supported	
Frequency counter	Range : 2Hz ~ 10MHz (Amplitude±15%±1word)	
Display	LED Segments type	
Input Power	AC 100V ~ 240VACrms, 45Hz ~ 440Hz (0.5A, T 250V Fuse)	
Environment	Temperature : 0°C ~ +39°C, Humidity : ~RH +70%, Altitude : ~3000m	
Size	About 225(W)×90(H)×270(D) mm	About 225 (W)×105(H)×285(D) mm
Weight	About 2.5 kg	About 3 kg
Standard Accessories	Output Cable kit, AC Power Cable, Manual	

# Digital Frequency Counter

## Protek U3003A

Protek U3003A Digital frequency counter realizes intelligent measurement by using microprocessor technology, and can be used by selecting mutual counter technology, high measurement precision, wide frequency measurement range (1Hz~3000MHz), and high sensitivity gate time. In addition, the low pass filter and attenuator on the front circuit of this counter are suitable for communication research and development.



### Feature

- ▶ 1Hz ~ 3GHz Broadband frequency measurement
- ▶ Application of MCU technology with wide frequency band of 3GHz and high reliability
- ▶ Reliable frequency counting of 8 digit segments and high precision
- ▶ Adopt frequency counter component element LSI, CPLD
- ▶ High measurement precision with MTBF≥10000h
- ▶ Supports 2 input channels (CH-A : ~100MHz, CH-B : ~3GHz )
- ▶ User-intuitive and easy button layout configuration

## Specifications

Model	Protek U3003A	
Max input Frequency	1 Hz ~ 3 GHz	
Period Range	10 ns~ 1 s	
Count accuracy	$10^8 - 1$	
Terminal type	BNC Female	
Input impedance	Channel A : 1M $\Omega$ //40pF	Channel B : 50 $\Omega$
Coupling	AC	
Dynamic input power	Channel A : 30mVrms ~ 250Vpp	Channel B : 30mVrms ~ 1Vrms
Frequency measurement range per channel	Channel A : 1 Hz ~ 100MHz	Channel B : 100 MHz ~ 3 GHz
CHA low pass filter	- 3dB bandwidth is about 100kHz	
CHA attenuation	$\times 1$ or $\times 20$	
Measurement error rate	$\pm$ time base error $\pm$ trigger error $\pm$ LSD LSD = 100ns/(Strobe time) $\times$ measured frequency (or measured period)	
Trigger error rate	When the measured signal noise is 40Db, trigger error $\leq 0.3\%$	
Strobe time	10ms、100ms、1s、10s	
Count display	0 ~ 99,999,999	
Crystal vibration frequency	10 MHz	
crystal frequency stability	$1 \times 10^{-5}/d$	
External input frequency	10 MHz	
External input frequency voltage	$> 1V_{pp}$	
Display	8 digits high bright, 0.5"inch numeral tube, 3 units LED indicator, a strobe LED indicator and a EXT FREQ mark LED indicator	
Input Power	AC 110~ 250V(1 $\pm$ 10%), 50Hz~60Hz((1 $\pm$ 5%), 20VA	
Environment	Temperature : 0°C ~ +39°C, Humidity : ~RH +70%, Altitude : ~3000m	
Size	About 280(W) $\times$ 90(H) $\times$ 240(D) mm	
Weight	About 1.5 kg	
Standard Accessories	BNC Cable, AC Power Cable, Manual	



# Bench type Digital LCR Meter

## Protek 9216A, 9261B Series



The Protek 9216 series, a bench-type digital LCR meter, is a multi-purpose instrument that can be used more precisely and reliably in various electronic parts development and production environments, with Protek Instrument's measurement know-how applied. The 9216B consists of two lineups, so you can choose a reasonable and economical choice depending on the purpose you want to use.

### Feature

Select Guide	Protek 9216A	Protek 9216B
Frequency	100Hz~ 100 kHz	20Hz~ 200kHz
Accuracy	±0.05 %~	
Functions	Auto, R+Q, L+Q, C+D, C+R	IZI, IYI, C, L, X, B, R, G, D, Q, θ, DCR
Display	LED Segments	High-definition 4.3" TFT LCD type
Interface	RS232C	USB, RS232C, Handler, Trig

## Specifications

Models	Protek 9216A	Protek 9216B
Test Functions	R+Q, L+Q, C+D, C+R	Z ,  Y , C, L, X, B, R, G, D, Q, $\theta$ , DCR
Frequency	100Hz, 120Hz, 1kHz, 10kHz, 100kHz	20Hz ~ 200kHz
FREQ Accuracy	$\pm 100$ ppm	$\pm 50$ ppm
Equivalent circuit	Serial or Parallel	
Test Accuracy	0.05%~ 0.1%	
Signal impedance	Not support	30 $\Omega$ , 100 $\Omega$ , Selected $\pm 1\%$ @1kHz
Parameter	Value, Deviation, % Deviation or Bin Number, selected display	All parameter display
Averaging	2 ~ 10 Measurement	1 ~ 255 Measurement
Calibration Environment	Warm up time : $\geq 30$ minutes ; Environment temperature : $23\pm 5^{\circ}\text{C}$ Signal Level : 1Vrms ; Correction: after OPEN, SHORT Testing cable length : 0m	
Measurement Range	R+Q R 0.0001 $\Omega$ ~ 2000M $\Omega$ L+Q L 0.0001 $\mu\text{H}$ ~ 99999H Q 0.00001 ~ 50 C+D C 0.0001pF ~ 99999 $\mu\text{F}$ D 0.00001 ~ 10 C+R C 0.0001pF ~ 99999 $\mu\text{F}$ R 0.00001 ~ 99999k $\Omega$	Z , R, X 0.00001 $\Omega$ ~ 99.9999 $\Omega$  Y , G, B 0.00001 $\mu\text{s}$ ~ 99.9999s C 0.00001pF ~ 9.99999F L 0.00001 $\mu\text{H}$ ~ 99.9999Kh D 0.00001 ~ 9.99999 Q 0.00001 ~ 99999.9 $\theta(\text{DEG}) -179.999^{\circ} \sim 179.999^{\circ}$ $\theta(\text{RAD}) -3.14159 \sim 3.14159\Omega$ $\Delta\%$ -999.999% ~ 999.999%
DCR Range	0.00001 $\Omega$ ~ 99999k $\Omega$	0.00001 $\Omega$ ~ 99.9999 M $\Omega$
Operating voltage	0.1V, 0.25V, 1Vrms	10mV~ 2Vrms
Voltage Accuracy	$\pm 2\%$	$\pm 1\%$
DC Bias Voltage	INT: 0~2VDC $\pm 2\%$ EXT: 0~+40VDC	INT : 0V~ $\pm 5$ VDC $\pm 1\%$
Trigger Mode	EXT Trigger & RS232C Trigger	INT, EXT, MANUAL, BUS Trigger Support
Range Setting	Auto or Manual	Auto, Manual, Hold
Scan Speed	Slow, 500ms, Medium 100ms, Fast: 50ms	Fast : 75meas/sec(13ms), Medium : 11meas/sec(90ms), Slow: 2.7meas/sec(370ms)
Math	Not support	Direct reading, $\Delta\text{ABS}$ , $\Delta\%$
Trigger delay	Not support	0 ~ 60.000s 1ms steps
Data storage	Setup 9 Data	LCRZ Value, Setup : INT 100 Data 201hour test & EXT USB Disk max 16GB
Comparator Function	External control only via RS-232C	Internal self-control possible 10 bins, BIN1-BING9, NG, AUX Bin count function, Pass/Fail - 10 point Sweep list - FREQ, ACV/ACA, INT/EXT BIAS V/A SWEEP. (Each sweep point is individually aligned)
List Sweep	Not support	
Calibration	Open, Short, Load	
Interface	RS232C	RS232C, USB, HANDLER
Display	Dual LED Segments	4.3"inch TFT LCD, RGB 480 x 272 pixels
Input Power	AC 100V ~ 240VACrms, 45Hz ~ 440Hz (1A, T 250V Fuse)	
Environment	Temperature : $0^{\circ}\text{C} \sim +40^{\circ}\text{C}$ , Humidity : ~RH +70%, Altitude : ~3000m	
Size	About 363(W) $\times$ 109(H) $\times$ 386(D) mm	About 235(W) $\times$ 105(H) $\times$ 360(D) mm
Weight	About 5.8 kg	About 3.6 kg
Standard Accessories	Test Fixture, AC Power Cable, Manual	
Optional Accessories	Kelvin Clip, SMD Tweezer, Short Bar, GPIB, RS485 interface card (Factory only optional)	

# Bench type Digital Multimeter

## **Protek** 4000, 4000E Series



“Protek 4000” series 4½ digital multimeter is a product with a simple design and significantly improved specifications compared to existing products. In addition, by adopting a high-brightness VFD dual measurement display with excellent measurement efficiency such as AC/DC voltage, current, or frequency, measurement parameters are clearly displayed for easy viewing by users, and the internal SMD has been greatly improved to support RS-232C interface, etc.

It is an economical, high-efficiency, and high-performance product that satisfies various control environments through SCPI commands.

### Feature

- ▶ Display indication: 51,000 count (Protek 4000E is 21,000 count)
- ▶ Supports up to 20A broadband current measurement (10A for Protek 4000E)
- ▶ Simultaneous measurement mode support through VFD dual segment
- ▶ High precision up to  $\pm 0.02\%$
- ▶ Built-in 12 measurement functions and calculation functions
- ▶ Fast measurement speed of up to 30 measurements per second
- ▶ Supports %, dB, dBm, REL measurement function
- ▶ Quick measurement alignment with no covering calibration and limit functions (HI/LO/IN)
- ▶ Supports remote control and SPCI commands through RS232C interface

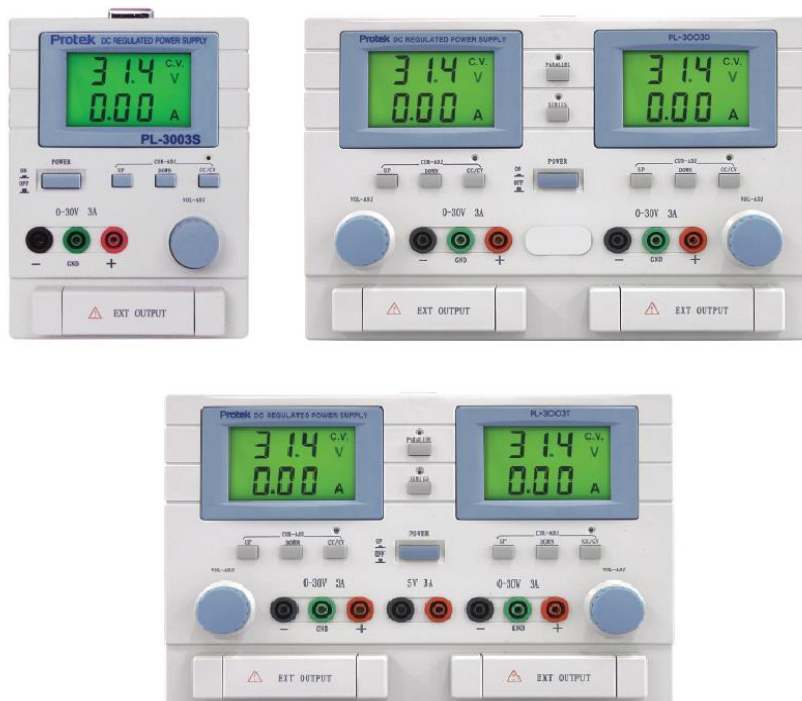
## Specifications

Models	Protek 4000 (4000E Model 21,000 Count)		
Classification	Range (Max)	Resolution	Accuracy (1year)
DC V	500 mV (510.00)	10 $\mu$ V	0.02+0.016 (10M $\Omega$ )
	5 V (5.1000)	100 $\mu$ V	0.02+0.008 (11.1M $\Omega$ )
	50 V (51.000)	1 mV	0.02+0.008 (11.1M $\Omega$ )
	500 V (510.00)	10 mV	0.02+0.008 (10M $\Omega$ )
	1000 V (1000.0)	100 mV	0.02+0.008 (10M $\Omega$ )
AC V (1.0+0.08~) (True RMS)	500 mV (510.00)	10 $\mu$ V	1.0+0.08 (20Hz~50Hz)
	5 V (5.1000)	100 $\mu$ V	0.5+0.06 (50Hz~20kHz)
	50 V (51.000)	1 mV	1.5+0.1 (20kHz~50kHz)
	500 V (510.00)	10 mV	3.0+0.3 (50kHz~100kHz)
	750 V (750.0)	100 mV	( Input Impedance: 1M $\Omega$ +2%, <100pF )
DC A (max 10A for 4000E)	5 mA (5.1000)	0.1 $\mu$ A	0.05+0.01 (<0.6V/100 $\Omega$ )
	50 mA (51.000)	1 $\mu$ A	0.05+0.008 (<0.06V/1 $\Omega$ )
	500 mA (510.00)	10 $\mu$ A	0.05+0.008 (<0.6V/1 $\Omega$ )
	5 A (5.1000)	100 $\mu$ A	0.25+0.01 (<0.1V/10m $\Omega$ )
	20 A (21.000)	1 mA	0.25+0.01 (<0.6V/10m $\Omega$ )
AC A (Max 20sec) (True RMS) (max 10A for 4000E)	5 mA (5.1000)	0.1 $\mu$ A	1.5+0.16~2.0 (20Hz~50Hz, <0.6V/100 $\Omega$ ) 0.5+0.08~0.5+0.1 (50Hz~2kHz, <0.06V/1 $\Omega$ ) 2.0+0.12~2.0+0.12 (2kHz~20kHz <0.6V/1 $\Omega$ )
	50 mA (51.000)	1 $\mu$ A	
	500 mA (510.00)	10 $\mu$ A	
	5 A (5.1000)	100 $\mu$ A	
	20 A (21.000)	1 mA	
Resistance $\Omega$ (max 20M $\Omega$ for 4000E)	500.00 $\Omega$ (510.00)	10 m $\Omega$	0.10+0.01 (0.5mA)
	5.0000 k $\Omega$ (5.1000)	100 m $\Omega$	0.10+0.008 (0.45mA)
	50.000 k $\Omega$ (51.000)	1 $\Omega$	0.10+0.008 (45 $\mu$ A)
	500.00 k $\Omega$ (510.00)	10 $\Omega$	0.10+0.008 (4.5 $\mu$ A)
	5.0000 M $\Omega$ (5.1000)	100 $\Omega$	0.15+0.008 (450nA)
	50.000 M $\Omega$ (51.000)	1 k $\Omega$	0.3+0.01 (45nA)
Continuity	500 $\Omega$ ~50M $\Omega$ (<10 $\Omega$ ~<1M $\Omega$ )	100 m $\Omega$	0.1+0.04 (DC <5.5V, 0.5mA)
Diode	2 V (2.3000)	100 $\mu$ V	0.1+0.04 (0.5mA)
Frequency / Period (AC V)	5Hz~10 Hz (1~10 $\mu$ s)	100 $\mu$ Hz (0.1ns)	0.05%+0.02(0.01+0.008) 200mVrms
	10Hz~ 100Hz (10 $\mu$ s~10ms)	1mHz (1ns)	0.01%+0.02(0.01+0.008) 200mVrms
	100Hz~100kHz (10m~100ms)	10mHz (1 $\mu$ s)	0.01%+0.008(0.01+0.02) 200mVrms
	100kHz~1MHz (100ms~200ms)	10Hz (10 $\mu$ s)	0.01%+0.008(0.05+0.02) 200mVrms
Scan speed	HIGH, MED, SLOW	Error within >5% range for each (Max crest factor 3.0at (full scale)	
Triggering	Reading hold sensitivity: 0.01%, 0.1%, 1% or 10% of reading		
Math	Rel, Max/Min, dBm, dB, Compare Limit Test and %, HOLD, AC+DC		
dBm Ref $\Omega$	1 $\Omega$ ~9999 $\Omega$	(1 $\Omega$ step size), default is 75 $\Omega$	
Overload protection	Max input: 1A / 250V fuse		
Interface	RS232C (SCPI command support)		
Display	51,000 count VFD dual indication display (21,000 counts for 4000E model)		
Input Power	AC 110~ 250V(1 $\pm$ 10%), 50Hz~60Hz(1 $\pm$ 5%), 10VA		
Environment	Temperature : 0 $^{\circ}$ C ~ +40 $^{\circ}$ C, Humidity : ~RH +80%, Altitude : ~3000m		
Size & Weight	Size : About 225(W) $\times$ 100(H) $\times$ 355(D) mm, Weight : About 2.5kg		
Standard Accessories	Testlead kit, AC Power Cable, Manual		
Optional Accessories	6 in 1 Testlead kit set, USB and GPIB interface (Factory Optional)		

# Regulated DC Power supply

## Protek PL-3000 S,D,T Series

The linear Protek PL-3000 series DC power supply enables more stable power output by applying Protek's high-precision SMD deposition element technology, and outputs a wider range of power with 2 variable channels and up to 4 variable output terminals interlocked expansion output terminals. By doing so, the user can make a more reasonable choice with equipment that maximizes the efficiency of up to six units with just one unit based on the Protek PL-3000T 3channels model.



### Feature

- ▶ DC 30V~120V. 1A to 5A output model selectable
- ▶ Supports 1~3 (variable 2CH + fixed 1CH) output channel models and variable channel-linked expansion output terminals
- ▶ 100 mV, 10 mA display resolution
- ▶ High-precision voltage/current adjustment through Protek SMD deposition element technology and multi-loop method
- ▶ Users can use intuitively by applying dual display
- ▶ Linear type with high output accuracy of  $\pm 0.05\%$
- ▶ CC/CV MODE & Tracking mode, Serial/Parallel mode support (PL3000D,T Series)

## Specifications

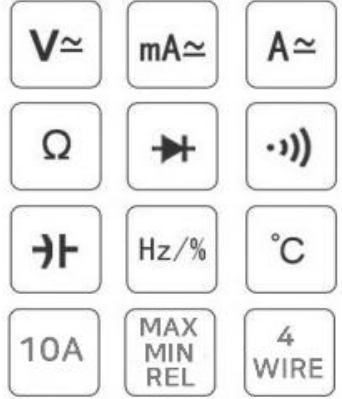
Models	PL-3003S	PL-3005S	PL-5003S	PL-6002S	PL-12001S
Power	90 W	150 W			
Output Voltage	0~ 30V		0~ 50V	0~ 60V	0~ 120V
Output Current	0~ 3A	0~ 5A	0~ 3A	0~ 2A	0~ 1A
Display Resolution	Voltage 100mV, Current 10mA (3-digit display, Accuracy ±0.05%~)				
Output type	Variable 1CH (+EXT output 2CH)				
Current Stepwise	30mA±3mA				
Line stability	CV ≤5x10 <sup>4</sup> mV / CC ≤5x10 <sup>4</sup> mV / CV ≤5x10 <sup>4</sup> mA / CC ≤5x10 <sup>4</sup> mA (Error rate within 3%)				
Load stability	CV ≤5x10 <sup>4</sup> mV / CC ≤5x10 <sup>4</sup> mV / CV ≤5x10 <sup>4</sup> mA / CC ≤5x10 <sup>4</sup> mA (Error rate within 3%)				
Ripple & Noise	CV ≤0.5mV / CV ≤2mV / 0.1% + 10mA (Error rate within 3%)				
Display	Single Back light LCD (3Digit)				
Size	About 130(W)×190(H)×270(D) mm				
Weight	About 4.8kg	About 5.6kg			

Models	PL-3003D	PL-3005D	PL-3003T	PL-3005T	PL-5003T
Power	90 W	150 W			
Output Voltage	0~ 30V			0~ 50V	
Output Current	0~ 3A	0~ 5A	0~ 3A	0~ 5A	0~ 3A
Display Resolution	Voltage 100mV, Current 10mA (3-digit display, Accuracy ±0.05%~)				
Output type	Variable 2CH (+EXT output 4CH)		Variable 2CH + Fixed 1CH (+EXT output 4CH)		
Fixed Output	Not support		5A, 3A Fixed output terminal		
Current Stepwise	30mA±3mA				
Line stability	CV ≤5x10 <sup>4</sup> mV / CC ≤5x10 <sup>4</sup> mV / CV ≤5x10 <sup>4</sup> mA / CC ≤5x10 <sup>4</sup> mA (Error rate within 3%)				
Load stability	CV ≤5x10 <sup>4</sup> mV / CC ≤5x10 <sup>4</sup> mV / CV ≤5x10 <sup>4</sup> mA / CC ≤5x10 <sup>4</sup> mA (Error rate within 3%)				
Ripple & Noise	CV ≤0.5mV / CV ≤2mV / 0.1% + 10mA (Error rate within 3%)				
Display	Dual Back light LCD (3Digit)				
Size	About 270(W)×180(H)×310(D) mm				
Weight	About 11kg	About 13kg	About 11.5kg	About 13.5kg	



## General specifications

Function	CC & CV Mode / Tracking mode, Serial & Parallel Mode (3000T & 3000D series only)
Environment	Temperature : 0°C ~ +40°C, Humidity : ~RH +70%, Altitude : ~3000m
Input Power	AC 110~ 250V(1±10%), 50Hz~60Hz(1±5%), 20VA, within protective fuse (250V, 1A)
Standard Accessories	Output lead kit, AC Power Cable, Manual
Optional Accessories	Output lead wire for fixed output terminal

# Protek Portable Measuring Instrument (1)

Models	Products	Features
<p>Digital Multimeter Protek D707T (6,000 Count)</p>		 <p>DC : 1000V / AC : 750V</p>
<p>Digital Multimeter Protek D708T (8,000 Count)</p>		 <p>DC : 1000V / AC : 750V</p>
<p>Digital Multimeter Protek D706T (6,000 Count)</p>		 <p>DC : 1000V / AC : 750V</p>
<p>Digital Pocket Tester Protek JT-11 (2,000 Count)</p>		 <p>(AC/DC 500V Max)</p>

# Protek Portable Measuring Instrument (2)

Models	Products	Features
<p>Clamp Meter Protek 307 (4,000 Count)</p>		<div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">V<sub>≈</sub></div> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">W</div> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">A<sub>≈</sub></div> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">Ω</div> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">RS 232</div> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">MAX MIN REL</div> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">BAR</div> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">Hz</div> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">△</div> </div> <p>AC/DCV : 600V, AC/DCA:1000A (Power analyzer mode)</p>
<p>Auto motive Tester Protek ADM288 (For Car)</p>		<ul style="list-style-type: none"> <li>▶ Battery Test (0~30V)</li> <li>▶ Start motor test</li> <li>▶ Ramp test</li> <li>▶ Relay, window motor test</li> <li>▶ short breaker</li> <li>▶ work light, buzzer</li> </ul>
<p>AC Socket Tester Protek S1 (KO,EU Plug)</p>		<ul style="list-style-type: none"> <li>▶ AC 250V Test</li> <li>▶ NCV,GND,Polarity,Livewire</li> <li>▶ RCD Test(30mA)</li> <li>▶ Battery &amp; Beep Indigator</li> <li>▶ LCD status indication</li> </ul>
<p>Analog Multimeter Protek HC-260TR (The New)</p>		<div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">V<sub>≈</sub></div> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">mA<sub>≈</sub></div> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">A<sub>≈</sub></div> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">Ω</div> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">▶</div> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">)))</div> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">TR</div> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">Back light</div> <div style="border: 1px solid gray; padding: 5px; margin: 2px;">10A</div> </div>



# Protek Portable Measuring Instrument (3)

Models	Products	Features
<p>Infrared Thermometer Protek T101 (-50°C~+550°C)</p>		
<p>Thermal imaging Camera Protek T1M (19,200 Pixel)</p>		<ul style="list-style-type: none"> <li>▶ -20°C ~+250°C</li> <li>▶ 8~14um, 60Hz</li> <li>▶ 4.4mrad spatial resolution</li> <li>▶ Visible image support</li> <li>▶ 3.2" TFT LCD</li> <li>▶ USB-C Interface</li> <li>▶ Rechargeable Battery (3hour work)</li> <li>▶ Data report (CSV)</li> </ul>
<p>Decade Resistance Box Protek TRB-01 (5Dial type)</p>		<ul style="list-style-type: none"> <li>▶ 0~ 9999.9Ω Variable</li> <li>▶ Protect : ~12V, ~3A (about 10sec)</li> <li>▶ Accuracy ±3%</li> <li>▶ 5 Dial variable type</li> <li>▶ Banana type Terminal</li> <li>▶ Basic science education</li> </ul>

- © Matters to be considered when purchasing measuring equipment
- ① For detailed specifications and standards, please contact the sales representative or Protek customer support center.
  - ② The driving specifications of each product are based on our test environment and may vary depending on the user's environment.
  - ③ Product specifications and design may be changed without prior notice for reasons of quality and performance improvement.

# Protek Accessories (1)

Accessories	Products	Model	Features
Oscilloscope	Passive Probe	PT-P03	10X, 1X, 60MHz
	Passive Probe	PT-P04	10X, 1X, 100MHz
	Passive Probe	PT-P05	10X, 1X, 200MHz
	Passive Probe	PT-P06	10X, 1X, 300MHz
	High Voltage Probe	PT-P20	100:1, 250MHz, AC/DC 1.5kV
	High Voltage Probe	PT-P21	1000:1, 50MHz, DC 15kV, AC10kV
	Differential Probe	PT-P30	100X, 10X, 100MHz, AC/DC 800Vpp
	High Differential Probe	PT-P31	1000X, 100X, 100MHz, AC/DC 1.5kV
	High Differential Probe	PT-P32	1000X, 100X, 50MHz, AC/DC 3kV
	High Differential Probe	PT-P33	1000X, 100X, 120MHz, AC/DC 14kV
	Current Probe	PT-P40	DC-100kHz, 60A, DC
	Current Probe	PT-P41	DC-100kHz, 100A, DC
	Current Probe	PT-P42	DC-100kHz, 200A, DC
	Current Probe	PT-P43	DC-25MHz, 20A, AC/DC
	Current Probe	PT-P44	DC-50MHz, 40A, AC/DC
		Impedance Matching Pad	TLB-01
Generator	BNC to BNC Cable	TBN-01	50Ω, length :90cm
	BNC to Alligator Cable	TBNA-02	50Ω, length :90cm
	GD-2000N Digital Module	GD2000N-D01	Digital output interface
RF Instrument	SMA Type Cable	TSMA-01	Male, length :90cm
	N Type Cable	TN-01	Male, length :90cm
	SMA to N Type Cable	TSMN-01	Male, length :90cm
	9GHz 4 in 1 VNA Calkit	WW39MT	9GHz, Open+Short+Load+Through, SMA Type
	6GHz 3 in 1 VNA Calkit	WW36MT	6GHz, Open+Short+Load N Type
	8GHz VNA Electronic Calkit	GK38T	8GHz, Open+Short+Load+Through, N Type Auto
	A733, A734 RF Test kit	RF-KIT1	315MHz~ 2.4GHz Antenna and Adapter set
	A733, A734 RF RF Test kit	RF-KIT2	315MHz~ 2.4GHz Antenna and Adapter set
	A734, A434L Charger	C122R5	Battery charger cradle
	A333, A338 GPIB	A33X-GPIB	GPIB Interface Module
Multimeter	10A TESTLEAD	TLM-01	10A DMM TEST LEAD
	20A TESTLEAD	TLM-02	20A DMM TEST LEAD
	6 in 1 Multi Tester kit	TLM-03	5 types including 10A test leads
Power Supply	10A Banana Alligator cable	TPC-01	AC/DC 50V, 10A, length : 60cm
	50A Banana Alligator cable	PWC-02	AC/DC 600V, 50A, length : 90cm

# Protek Accessories (2)

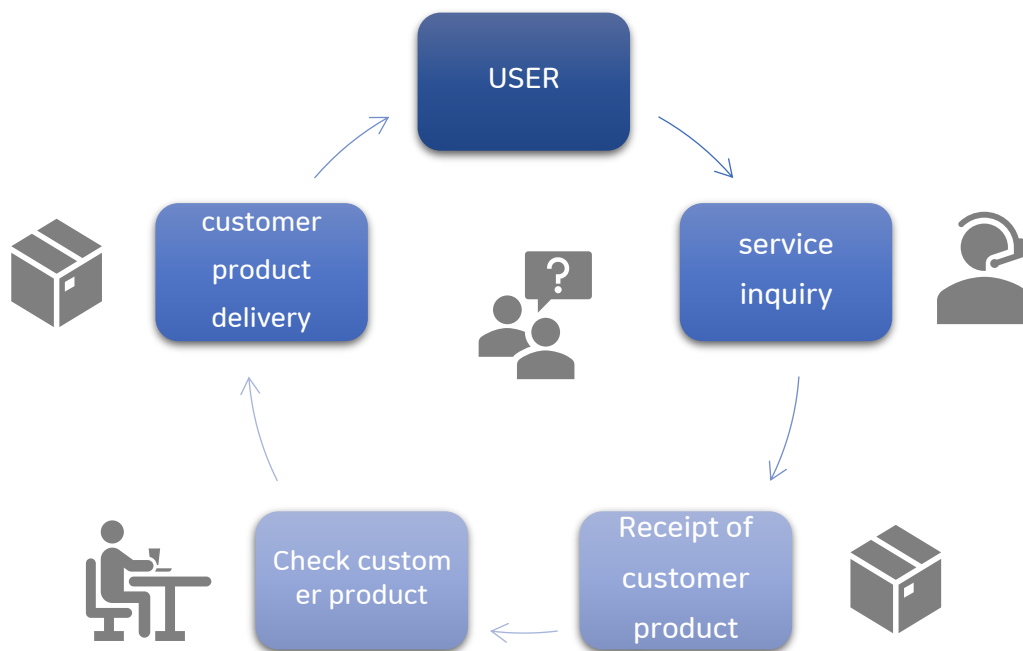
Accessories	Products	Model	Features
LCR Meter	Kelvin Clip	9216 Kelvin	Clip Testlead
	SMD Tweezer	9216 SMD	SMD Testlead
	GPIB Interface	9216B GPIB	9216B GPIB Interface Module
ETC	RS-232C Cable	RS232C	General RS-232C Interface cable
	USB Cable	USB TMC	General USB Interface cable
	AC power cable	EU, KO, US	EU & KC & US Certificate
	GPIB Cable	GPIB TMC	General GPIB Interface cable
	K-type thermocouple cable	TP-60	-50°C~ +600°C, length : 50cm K-type
	Cable for extended output	PWC-03	PL-3000series DC-PWS Cable
	RS232 to USB Cable	RS232-USB	RS232C to USB conversion adapter cable
	Print Port Cable	PRINTPORT	Print Port USB Cable
	Impedance Matching Pad	TLB-02	50Ω to 1MΩ, BNC to Alligator type
	50A Banana power testlead	PWC-01	AC/DC 600V, 50A, 90cm, Banana terminal
	50A Alligator power testlead	PWC-03	AC/DC 600V, 50A, 90cm, Alligator terminal
	Old HC-260TR Testlead	AMM Cord	OLD HC-260TR Testlead
	Wound variable bar resistance 30	200W 30Ω	tolerance ±5%(J), ceramic rod
	Wound variable bar resistance 100	200W 100Ω	tolerance ±5%(J), ceramic rod
	Wound variable bar resistance 500	200W 500Ω	tolerance ±5%(J), ceramic rod
	Wound variable bar resistance 1K	200W 1kΩ	tolerance ±5%(J), ceramic rod
	Wound variable bar resistance	Custom order	100W~ 1kW 30Ω~ 1kΩ Custom order
	Pen type Electroscope	VC1010	AC12V~1000V Detector, LCD Display
	DSO Passive Probe	PP-80	10X, 1X, 60MHz, General Oscilloscope
	DSO Passive Probe	PP-150	10X, 1X, 100MHz, General Oscilloscope
	DSO Passive Probe	PP-200	10X, 1X, 200MHz, General Oscilloscope
	DMM SMD Tweezer	SMD-TL01	AC/DC 250V, 2A, 65cm
	Digital vernier caliper	TLV-01	Range : ~150mm, ±0.05%, MONO LCD
	Non-contact tachometer	AR928	Range : 2.5~99,999 RPM Laser type
	Contact tachometer	AR925	Range : 0.5~19,999 RPM Rotation type
	Anemometer	AS816	1sec 0~58knots; 0~108km/h, 0~67mph
	Light meter	AS803	Range : 1~200,000Lux, (Lux, FC unit)
	Sound level meter	AS150	30~150dBA, Resolution 0.1dBA, Accuracy ±2%
	Vehicle brake fluid tester	BF100	DOT3, DOT4, DOT5.1 test support
	Wood Moisture Meter	AS971	Range : RH+2%~70%, Accuracy : ±0.5%
	Combustible gas meter	HT601A	18 volatile gas bar graph measurements sensitivity <50ppm



### In Protek Instrument Global standard service

For products produced by meeting our strict quality standards and certifications, Depending on the item, we guarantee its quality for up to ~2 years. For technical or service inquiries about our products, If you contact or inquire at the customer support center, we will respond promptly.

## PROTEK SERVICE PROCESS



## Protek Technical Support

E-mail : [protek@protekinst.com](mailto:protek@protekinst.com)

WEB : [www.protekinst.com](http://www.protekinst.com)

## Korea's leading measuring instrument brand **Protek** Story

New product launch in 2022	<ul style="list-style-type: none"> <li>• 2022.07</li> <li>• Mixed DSO Protek 8050series &amp; AWG Protek GD-10002N Launched</li> </ul>
Korean production certification	<ul style="list-style-type: none"> <li>• 2022.01</li> <li>• Korea government production certification (KOR GVM NO : 2022-0571-00001)</li> </ul>
Establishment of R&D Center in 2022	<ul style="list-style-type: none"> <li>• 2022.01</li> <li>• Establishment of Protek R&amp;D Center (KOR GVM NO : 2021116383)</li> </ul>
Development of new products in 2021	<ul style="list-style-type: none"> <li>• 2021.08</li> <li>• Development of variable decade box and impedance matching machine (TRB-01, TLI-01)</li> </ul>
Factory establishment and product KC certification	<ul style="list-style-type: none"> <li>• 2021.07</li> <li>• Gwangmyeong &amp; Incheon Plant Establishment Approval (Korea KC Certification)</li> </ul>
Protek Instrument Co., Ltd. Nationally Recognized.	<ul style="list-style-type: none"> <li>• 2021.06</li> <li>• Korean government company confirmation certification (NO : 0010-2022-495688)</li> </ul>
Separation of affiliates to specialize in measuring instrument business	<ul style="list-style-type: none"> <li>• 2021.06</li> <li>• Established Protek Instrument Co., Ltd. (GS Instech Group Separation)</li> </ul>
Korea's first VSWR multiport analyzer developed	<ul style="list-style-type: none"> <li>• 2016.05</li> <li>• Development of Protek 336M and Protek336S measuring instruments for VSWR analysis</li> </ul>
Developed Korea's first portable communication measuring device	<ul style="list-style-type: none"> <li>• 2015.07</li> <li>• Spectrum analyzer Protek A734, RF master Protek A434L development and production</li> </ul>
Development of high-performance handheld multimeter	<ul style="list-style-type: none"> <li>• 2013.11</li> <li>• Development and production of 5000 count class D705T (CE, UL certification acquired)</li> </ul>
Korea's first vector network analyzer development	<ul style="list-style-type: none"> <li>• 2008.03~ 2011.08</li> <li>• Protek A333, Protek A338 development and mass production, Korea technology award</li> </ul>
The beginning of a global leap	<ul style="list-style-type: none"> <li>• 2005.01~ 2007.01</li> <li>• Established Qingdao Heungchang Co.,Ltd.(Protek China) &amp; US corporation(GSteletech US)</li> </ul>
Acquired international production standardization certification	<ul style="list-style-type: none"> <li>• 2004.01</li> <li>• Acquired ISO9001, 14001, TL9001 certification</li> </ul>
Great Transformation of Korea's Instrumentation Business	<ul style="list-style-type: none"> <li>• 2004.07</li> <li>• GS Instruments Co., Ltd. (now GS Instech) merged with Heungchang Mulsan Co., Ltd.</li> </ul>
The Beginning of 50 Years of Instrumentation History in Korea	<ul style="list-style-type: none"> <li>• 1972.06</li> <li>• Established "Heungchang Co., Ltd.", a company specializing in measuring instruments</li> </ul>

### Protek Instrument Corporate philosophy

"Passion 열정"  
 "Creative 창조"  
 "Challenge 도전"

# Protek

Korea's Leading Test & Measuring Brand

[www.protekinst.com](http://www.protekinst.com)

## Protek Instrument Co.,Ltd

Headquarter : #801, Mcluster, 17 Deokan-ro,  
104beon-gil, Gwangmyeong-si,  
Gyeonggi-do, 14353, Korea

Protek Factory : #C-B123, 283 Bupyeong-daero,  
Bupyeong-gu, Incheon, 21315, Korea

TEL : +82-70-8866-8244

FAX : +82-32-724-4292

E-mail : [protek@protekinst.com](mailto:protek@protekinst.com)

WEB : [www.protekinst.com](http://www.protekinst.com)