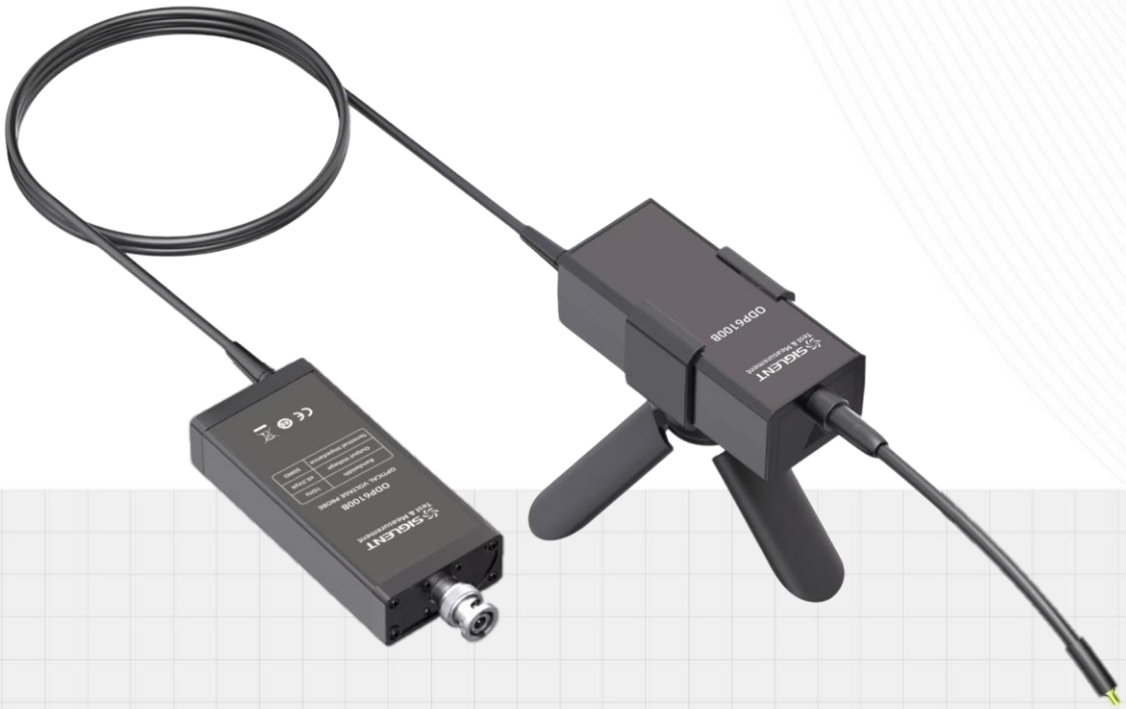
ODP6000B Series Optical Isolated Voltage Probe

Instruction Manual

EN01D



Copyright Information

Contents

Preface

First of all, thank you for purchasing our products, this instruction manual is the description about the function, usage, operation attention points, etc. Before use, please read the instructions carefully and use correctly.

Manual annotation will use the following symbols to distinguish.

This symbol means it is harmful to the machine and human body; you must strictly follow the instruction manual to operate.

In the case of wrong operation, the user risk injury. The content under this mark records the relevant matters needing attention to avoid such dangers.

The user may suffer minor injuries and material damage with the wrong operation. To avoid such situation, the matters under this mark need attention.

This symbolizes important note about how to use the machine.

To the safely use the machine, you must abide by the following safety precautions strictly. The violation against the manual is likely to damage the protective function of the machine. In addition, the company is not responsible for any safety problem caused by the violation of matters needing attention in operation.

- Please be careful to the danger of electric shock and pay attention to highest input voltage.
- Do not operate in wet or combustible conditions.
- Make sure the circuit under test is turned off before access it to the probe.
- Turn off the circuit after the measurement, and then remove the probe.
- When BNC cables are connected to the oscilloscope or other instruments, ensure the BNC terminal is well grounded.
- Check the probe skin and probe lead regularly. If there is any breakage, stop using it immediately.

Vorwort

Zunächst einmal vielen Dank für den Kauf unserer Produkte, diese Bedienungsanleitung ist die Beschreibung über die Funktion, Verwendung, Bedienung Aufmerksamkeitspunkte, etc. Bitte lesen Sie vor Gebrauch die Gebrauchsanweisungen sorgfältig durch und verwenden Sie sie richtig.

Manuelle Anmerkungen verwenden die folgenden Symbole zur Unterscheidung.

Dieses Symbol bedeutet, dass es schädlich für die Maschine und den menschlichen Körper ist; Sie müssen die Bedienungsanleitung strikt befolgen, um zu bedienen.

Bei falscher Bedienung riskiert der Benutzer Verletzungen. Der Inhalt unter diesem Zeichen zeichnet die relevanten Angelegenheiten auf, die beachtet werden müssen, um solche Gefahren zu vermeiden.

Bei falscher Bedienung kann der Benutzer leichte Verletzungen und Materialschäden erleiden. Um eine solche Situation zu vermeiden, müssen die Themen unter diesem Zeichen behandelt werden.

Dies symbolisiert wichtige Hinweise zur Bedienung der Maschine.

Um die Maschine sicher zu benutzen, müssen Sie die folgenden Sicherheitsvorkehrungen strikt einhalten. Der Verstoß gegen das Handbuch kann die Schutzfunktion der Maschine beschädigen. Darüber hinaus ist das Unternehmen nicht verantwortlich für Sicherheitsprobleme, die durch die Verletzung von Angelegenheiten verursacht werden, die im Betrieb Aufmerksamkeit erfordern.

- Bitte achten Sie auf die Gefahr eines Stromschlags und achten Sie auf höchste Eingangsspannung.
- Nicht unter nassen oder brennbaren Bedingungen arbeiten.
- Stellen Sie sicher, dass der zu prüfende Stromkreis ausgeschaltet ist, bevor Sie ihn zur Sonde greifen.
- Schalten Sie den Stromkreis nach der Messung aus, und entfernen Sie dann die Sonde.
- Wenn BNC-Kabel an das Oszilloskop oder andere Geräte angeschlossen sind, stellen Sie sicher, dass die BNC-Klemme gut geerdet ist.
- Überprüfen Sie regelmäßig die Sondenhaut und die Sondenleitung. Wenn es einen Bruch gibt, hören Sie sofort auf, es zu verwenden.

Introduction

The ODP6000B series is an advanced optically isolated voltage probe with exceptionally high common-mode rejection ratio (CMRR). The CMRR of traditional differential probes decreases rapidly in the high-frequency range, making it extremely difficult to accurately measure small voltage signal waveforms under high common-mode interference (e.g., measuring the gate drive voltage of the high-side MOSFET in a half-bridge circuit). The ODP6000B series utilizes high-performance laser-based optical signal transmission technology to achieve ultra-high CMRR across the entire operating bandwidth, enabling customers to perform these challenging measurements at a low cost.

Product Characteristics:

- Dual replaceable batteries for extended operating time.
- Online calibration and zeroing without disconnecting from the device under test.
- Transmitter automatic sleep function (automatically wakes when the receiver is powered on; automatically sleeps 5 seconds after the receiver is powered off).
- Multiple attenuator options to meet various voltage measurement requirements.
- Extremely high common-mode rejection ratio (CMRR).
- Bandwidth up to 1 GHz.
- Isolation voltage up to 60 kV.
- High stability and low temperature drift.
- Compact size.

Application

The ODP6000B series is widely applicable in R&D, debugging, and maintenance of switching power supplies, motor drives, renewable energy inverters, frequency converters, LED lighting power supplies, inverter-based home appliances, and other power electronic devices.

- Floating signal measurements.
- Gate drive voltage measurements for Si/SiC/GaN power devices.
- Differential mode small-signal measurements under high common-mode voltage conditions.

Electrical Specifications

Model	ODP6050B	ODP6100B
Bandwidth (-3 dB)	500 MHz	1 GHz
Rise Time (Typical)	0.7 ns	0.45 ns
Terminal Load	50 Ω	50 Ω
Output Voltage Range	±0.5 V	±0.5 V
Host Noise (Vrms, Typical)	1.5 mV	1.5 mV
DC Accuracy	≤±1%	
Isolation Voltage (DC + Peak AC)	±60 kV	
Attenuator (50X) + Host Delay	15.3 ns (2-meter optical fiber)	
Power Supply	Front-end: Battery powered, approx. 8 hours operating time, approx. 30 days standby	
	Rear-end: USB 5 V/2 A	
Auto Calibration	Yes	
Operating Temperature	-10 ℃ to 60 ℃	

Attenuator Specifications

Attenuator Model	Connector Type	Attenuation Ratio	Measurement Range	Max. Non-Destructive Voltage	Input Impedance
CK-AT5X-2-SMA	MMCX	5:1	±2.5 Vpk	2 kVpp	1 MΩ‖28 pF
CK-AT10X-2-SMA	MMCX	10:1	±5 Vpk	2 kVpp	1 MΩ‖6 pF
CK-AT20X-2-SMA	MMCX	20:1	±10 Vpk	2 kVpp	5 MΩ‖6 pF
CK-AT50X-2-SMA	MMCX	50:1	±25 Vpk	2 kVpp	10 MΩ‖4 pF
CK-AT100X-2-SMA	MMCX	100:1	±50 Vpk	3 kVpp	10 MΩ‖2 pF
CK-AT200X-2-SMA	MMCX	200:1	±100 Vpk	3 kVpp	10 MΩ‖2 pF
CK-AT500X-2-SMA	HVMCX	500:1	±250 Vpk	5 kVpp	10 MΩ‖2 pF
CK-AT1000X-2-SMA	HVMCX	1000:1	±500 Vpk	5 kVpp	20 MΩ‖2 pF
CK-AT2000X-2-SMA	HVMCX	2000:1	±1000 Vpk	6 kVpp	20 MΩ‖2 pF
CK-AT5000X-2-SMA	HVMCX	5000:1	±2500 Vpk	6 kVpp	40 MΩ‖2 pF
CK-AT10000X-2-SMA	5.08 mm socket	10000:1	±5000 Vpk	12 kVpp	40 MΩ‖2 pF

Notes:

1. When the rise time of the measured signal is less than 3.5 ns, the oscilloscope input impedance should be set to 50 Ω for accurate measurements, and the oscilloscope's attenuation ratio should be adjusted accordingly.
2. For attenuators with MMCX connectors, SSMB connectors may be used as an alternative.
3. The ODP6050B and ODP6100B come standard with CK-AT50X-2-SMA, CK-AT1000X-2-SMA, CK-AT2000X-2-SMA, and CK-AT5000X-2-SMA. Other attenuator models must be purchased separately. The maximum test voltage decreases as the test frequency increases, as shown in the table below:

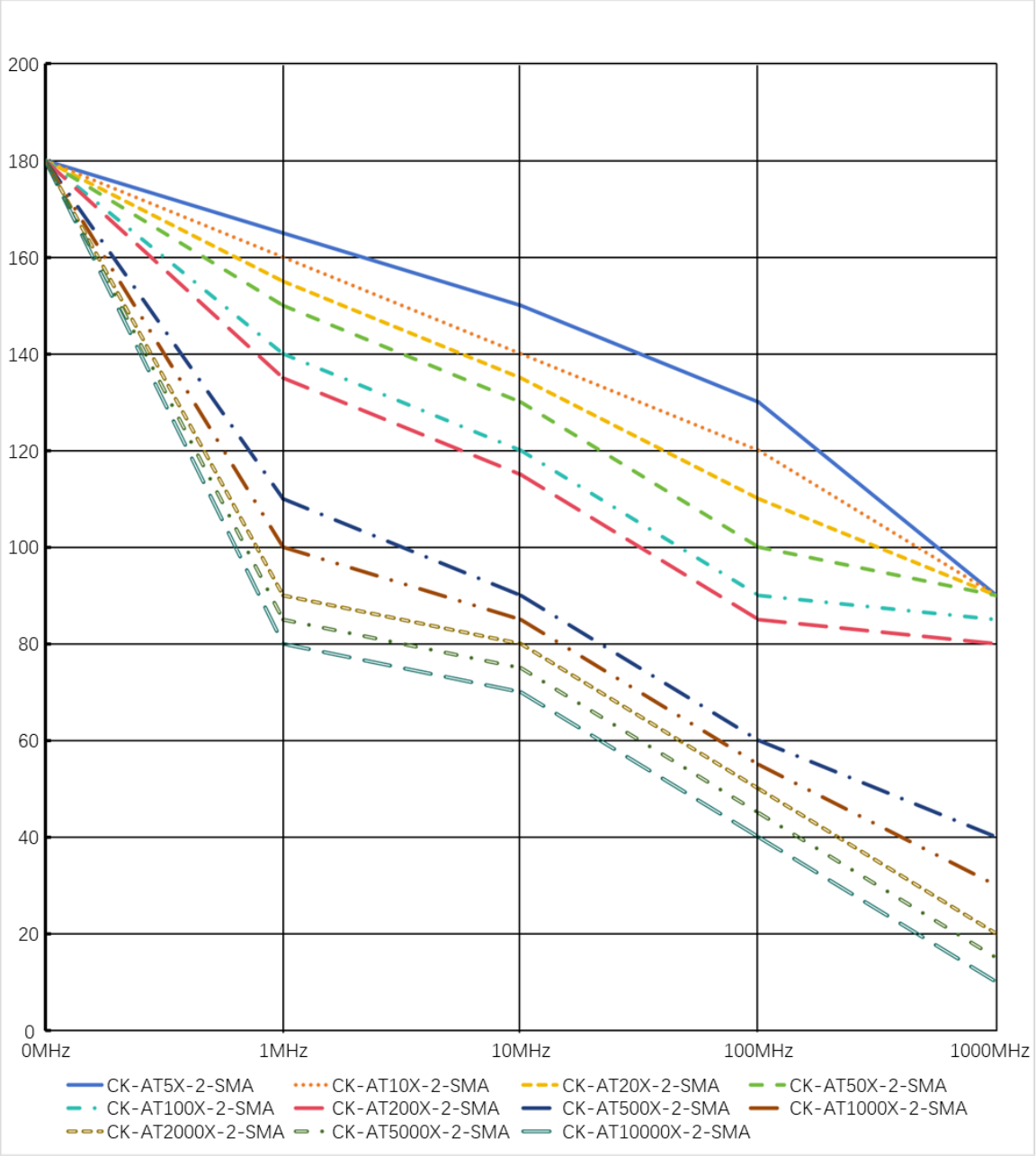
Maximum Test Voltage	Maximum Test Frequency
±5000 Vpk / ±2500 Vpk	700 kHz / 800 kHz
±1000 Vpk / ±500 Vpk	2 MHz / 3 MHz
±250 Vpk / ±100 Vpk	20 MHz / 50 MHz
±50 Vpk / ±25 Vpk	100 MHz / 200 MHz

Optional Attenuator Packing List

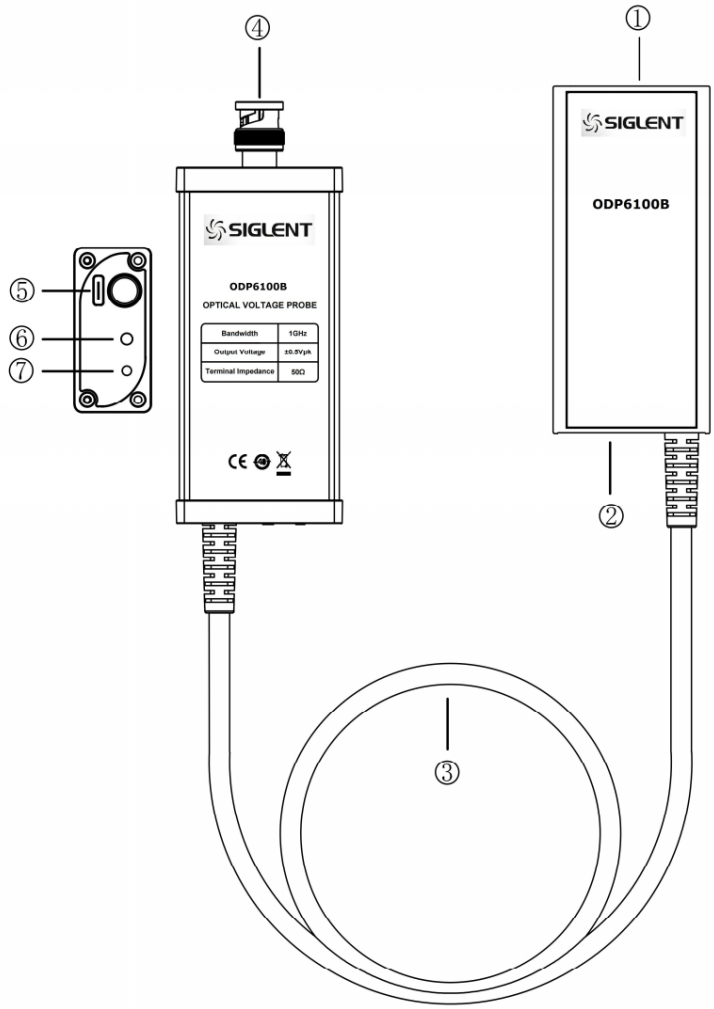
Connector Type	MMCX	HVMCX	5.08 mm Socket
CK-24 (HVMCX-K)	-	3	-
CK-202 (5.08_2p)	-	-	5
CK-326 (HVMCX Extension Cable)	-	1	-

Note: "-" indicates the accessory is not included.

CMRR Curves for Different Attenuators



Probe Description



① Attenuator Input Connector: SMA interface.

② Battery Indicator: Green indicates sufficient charge; red indicates low battery (recharge promptly).

③ Optical Fiber: Do not place heavy objects on the fiber or bend it to 90 degrees, as this may cause fiber breakage.

④ Output Connector: Standard BNC output interface.

⑤ Power Supply Port: Use only the provided standard adapter and power cable. Using other accessories may cause the device to malfunction.

⑥ Dual-Color Indicator:

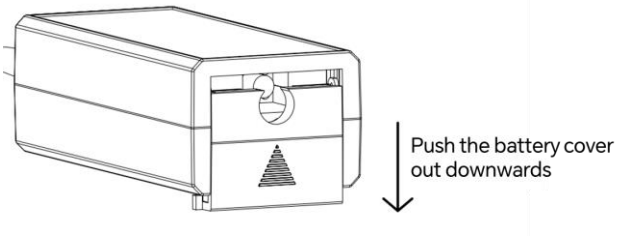
- Green flashing: Auto-calibration/zeroing in progress.
- Three beeps followed by steady green: Calibration successful.
- Steady green with a continuous 1–2 second buzzer sound: Calibration failed.
- Steady red: Host fault detected; repair may be required.

⑦ Auto-Zero Button: Press lightly once to initiate auto-calibration and zeroing.

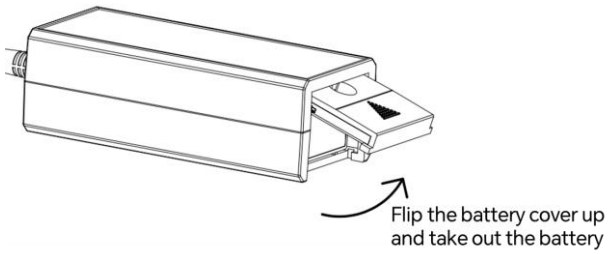
Battery Removal Instructions

When an attenuator is inserted, it acts as a mechanical stop, preventing battery removal. To remove the battery for charging, first detach the attenuator, then follow the steps below:

Step 1:

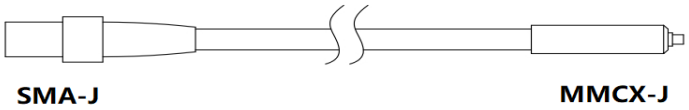


Step 2:

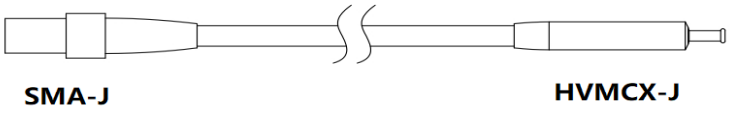


The ODP6000B series optical isolation probe features a unique dual-battery replaceable design, allowing uninterrupted measurements. It uses standard card-type digital camera lithium batteries. Should the battery degrade after years of use, customers can easily purchase a replacement battery themselves without returning the unit to the factory. This avoids potential shipping damage and minimizes measurement downtime, improving overall efficiency.

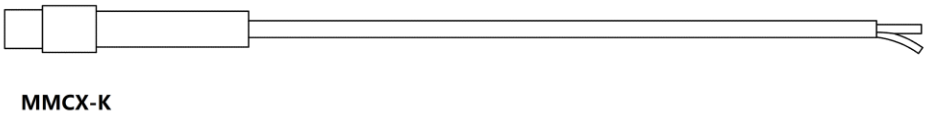
Main Accessories Diagram



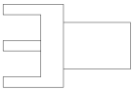
Attenuator with MMCX connector



Attenuator with HVMCX connector



CK-328 (MMCX to RG178)



CK-24 (HVMCX-K)

CK-28 (MMCX-K)

- Do not place heavy objects on the optical fiber cable. Avoid stressing the fiber.
- Do not crush, curl, or sharply bend the optical fiber. The minimum bend radius must be greater than 10 cm.
- Do not twist or tie knots in the optical fiber. Do not pull or yank the fiber, especially if it is twisted or knotted.
- Do not drop the E/O transmitter or O/E receiver, as this may damage or misalign internal optical components.
- Avoid crushing the optical fiber, e.g., rolling over it with a chair wheel or dropping heavy objects onto it.
- When not in use, store the optical isolation probe in the provided carrying case in its original configuration.
- Before each use, carefully inspect the optical fiber for damage such as tears or other defects. If any damage is found, discontinue use immediately.

Operating Procedure

⚠ CAUTION

Note: Please use the standard adapter and power cable provided by the manufacturer.

1. Estimate the amplitude of the voltage to be measured and insert an appropriate attenuator.
2. Connect to the oscilloscope and power on the device. Auto-calibration/zeroing will begin and take approximately 20 seconds (duration may vary depending on ambient and device temperature). If calibration fails, power cycle the receiver.
3. Set the oscilloscope's attenuation ratio according to the attenuator used, and adjust the oscilloscope's sensitivity based on the expected voltage range.
4. During measurement, keep the front-end transmitter box suspended as much as possible and away from high-voltage pulse circuits to minimize interference.
5. Since the front end of the probe is directly connected to high voltage on the device under test, always turn off the power to the circuit under test before removing the probe.

Mechanical Specifications

Item		Parameter
Probe Dimensions	Front-end E/O Transmitter	Approx. 102 × 45 × 33 mm
	Rear-end O/E Receiver	Approx. 106 × 49 × 23 mm
Attenuator Length		Approx. 200 mm
Optical fiber Length		Approx. 2 m
Probe Weight		Approx. 400 g

Warranty

Refer to the instructions on the warranty card.

Packing List

Item	ODP6050B	ODP6100B
Voltage Probe Unit	1	1
50X Attenuator (CK-AT50X-2-SMA)	1	1
1000X Attenuator (CK-AT1000X-2-SMA)	1	1
2000X Attenuator (CK-AT2000X-2-SMA)	1	1
5000X Attenuator (CK-AT5000X-2-SMA)	1	1
MMCX to Dupont Cable (CK-327)	2	2
MMCX-K (CK-28)	5	5
HVMCX-K (CK-24)	9	9
HVMCX Extension Cable (CK-326)	3	3
USB Power Supply Cable TYPE-C 1.5 m (CK-314A)	1	1
Power Supply Adaptor 5 V/2 A (CK-605)	2	2
E/O Transmitter Support Bracket (CK-690B)	1	1
MMCX to RG178 (CK-328)	2	2
Output Extension Cable (CK-325)	1	1
Battery Charger Set (CK-691)	1	1
Instruction Manual	1	1
Warranty Card	1	1
Test Report	1	1

Headquarters:

SIGLENT Technologies Co., Ltd

Add: Bldg No.4 & No.5, Antongda Industrial Zone,

3rd Liuxian Road, Bao'an District,

Shenzhen, 518101, China

Tel: + 86 755 3688 7876

Fax: + 86 755 3359 1582

Email: sales@siglent.com

Website: int.siglent.com

North America:

SIGLENT Technologies NA, Inc

Add: 6557 Cochran Rd Solon, Ohio 44139

Tel: 440-398-5800

Toll Free:877-515-5551

Fax: 440-399-1211

Email: support@siglentna.com

Website: www.siglentna.com

Europe:

SIGLENT Technologies Germany GmbH

Add: Staetzlinger Str. 70

86165 Augsburg, Germany

Tel: +49(0)-821-666 0 111 0

Fax: +49(0)-821-666 0 111 22

Email: info-eu@siglent.com

Website: www.siglenteu.com

Malaysia:

SIGLENT Technologies (M) Sdn.Bhd

Add: NO.6 Lorong Jelawat 4

Kawasan Perusahaan Seberang Jaya

13700, Perai Pulau Pinang

Tel: 006-04-3998964

Email: sales@siglent.com

Website: int.siglent.com

Follow us on
Facebook: SiglentTech

2774010798